CUK-H04740-20-0293994

CALCUTTA UNIVERSITY CENTRAL LIBRARY

Aslib Proceedings

(20)

incorporating Aslib Information

45th ASLIB ANNUAL CONFERENCE, DARMSTADT, October, 1971

Session 2: FUTURE DEVELOPMENTS IN INFORMATION TECHNOLOGY

1. *What equipment and systems can we expect in the '70s and beyond?* B. A. EDWARDS 11
2. *The implications of future technology for tomorrow's information worker* ROBERT JUNGK 22

Session 3: INTERNATIONAL INFORMATION NETWORKS

1. *The ESRO system* N. E. C. ISOTTA 31
2. *The International Nuclear Information System* C. W. PELZER 38

ASLIB · 3 BELGRAVE SQUARE · LONDON SW1

Aslib Proc. vol. 24 no. 1 pp. 1-67 London, January 1972

Claude Gill Books

a five star service to management

★ Management and Training Centre
A unique centre displaying over 10,000 titles on all aspects of management. Managers will find its comprehensive coverage meets all their needs.

★ Mail Order Supply
An efficient mail order section supplying books by post to customers throughout the world. Expert staff quickly trace current or out-of-print works, whatever the source.

★ Worldwide Journal Subscriptions
You can place a subscription with Claude Gill Subscriptions Ltd. for any journal, in any language, published anywhere in the world. Free renewal reminder service avoids interruption of supply.

H.M.S.O. ★ Publications
Government reports, bulletins and other publications available direct to visitors or mail order customers from a government publications department located within the Claude Gill showrooms.

'New Books' ★ Bulletins
Regular customers receive the monthly Claude Gill 'Management Newsletter' or 'Science Bulletin'. Listing and describing the most important new books and journals as they appear, these bulletins enable customers to keep up-to-date with latest developments.

Simply write to us if you would like to receive these bulletins for a 3 month trial period.

Claude Gill Books
Management & Training Centre, 481 Oxford St., London W1R 2AQ

Aslib Proceedings

Aslib

293994

Proceedings

incorporating Aslib Information

VOLUME 24
1972

Aslib
3 BELGRAVE SQUARE LONDON SW1

CONTENTS

45th ASLIB ANNUAL CONFERENCE, DARMSTADT, 1971

FUTURE DEVELOPMENTS IN INFORMATION TECHNOLOGY

1. What equipment and systems can we expect in the '70s and beyond? B. A. EDWARDS 11
2. The implications of future technology for tomorrow's information worker ROBERT JUNGK 22

INTERNATIONAL INFORMATION NETWORKS

1. The ESRO system N. E. C. ISOTTA 31
2. The International Nuclear Information System C. W. PELZER 38

Information flow in the construction industry: a study and the development of its recommendations DONALD BISHOP 79
Problems in using external information services—attitudes of the special library and its users L. CORBETT 96
UNISIST: a forum SCOTT ADAMS, JOHN GRAY, HERBERT COBLANS and F. W. MATTHEWS 111
The theoretical foundation of the IDC-system: six postulates for information retrieval ROBERT FUGMANN 123

Printed ephemera in British libraries JOHN E. PEMBERTON 162
Ergonomics and information systems J. G. FOX 178
The London Classification of Business Studies and management literature K. D. C. VERNON in association with VALERIE LANG 187
Summary of research undertaken by Aslib, 1966–1971 199
Librarians and the management of library systems P. A. THOMAS and VALERIE A. WARD 229
The foreign language and translation problems of the social sciences W. L. SAUNDERS 233
Patents as a source of technical information K. M. SAUNDERSON 244
The administration of diffuse collections WILFRED ASHWORTH 274
The Technical Indexes System for the control of trade literature M. FORD 284
Information services in university libraries J. HALL 293

ASLIB ENGINEERING GROUP CONFERENCE 1972

Value for money in Government library/information services C. D. OVERTON 325
Research by Aslib into costing of information services B. C. VICKERY 337
Financing a library/information service by operating a cost recovery system J. COOK 342
Teaching costing techniques to librarians and information scientists of the future R. STURT 350
Use, efficiency and cost of external information services A. KABI 356

Intermediate languages for switching and control ALAN GILCHRIST 387
Some thesauric history KAREN SPARCK JONES 400

CONTENTS

Some recent approaches to the study of meaning K. M. PETTT 412
Research and Aslib membership B. C. VICKERY 419

THE BRITISH LIBRARY AND THE SOCIAL SCIENCES

Interlibrary lending in the social sciences: a note MAURICE B. LINE 445
The British Museum Library and the social sciences: Reference services G. H. SPINNEY 449
The British Library of Political and Economic Science: Reference, services D. A. CLARKE 459
Other national resources in the social sciences K. W. HUMPHREYS 464
Retrospective bibliographical services in the social sciences R. A. CHRISTOPHERS 470
Desiderata for national bibliographical services N. ROBERTS 473
Summary and conclusions 480

SOURCES OF INFORMATION ABOUT THE EEC

INFORMATION SOURCES ABOUT THE EEC IN THE UNITED KINGDOM

1. Government and official sources of information RONALD MAYERS 501
2. Commercial and non-Government sources of information A. L. SMYTH 506
3. Law and taxation in the EEC and its member countries W. A. F. P. STEINER 514

INFORMATION SOURCES ABOUT THE EEC IN EUROPE

1. Market information IAN MACLEAN 525
2. Information on European companies GEORGE P. HENDERSON 532

TOMORROW'S INFORMATION WORKER: EDUCATION AND TRAINING

INFORMATION WORK AND WORKERS IN THE COMING DECADE

1. Manpower requirements and training B. J. PERRY 556
2. Roles and systems: the need for change B. T. STERN 562
The place of professional education in higher education in the future BRYAN THWAITES 565

WHAT EDUCATIONAL PROGRAMME IS REQUIRED TO PRODUCE THE NECESSARY SPECIALISTS?

1. The programme that exists and omissions T. BRIMELOW 570
2. Education of information specialists for the 1970's HERBERT SCHUR 574

UDC revise or relegate? G. A. LLOYD, D. NEWCOMBE, J. ROLAND SMITH and A. C. FOSKETT 580
Thesaurus reconciliation H. H. NEVILLE 620
Looking at libraries P. A. THOMAS 627
Analysing industrial information service costs: a simple check list ALAN ARMSTRONG 635

46th ASLIB ANNUAL CONFERENCE, SHEFFIELD, 1972

Structure of information services D. V. ARNOLD 654

CONTENTS

External sources of information—services available and criteria for evaluation B. C. VICKERY 664
The use of external data bases to extend current awareness services based on internal resources at UKAEA Harwell J. E. TERRY and P. J. JONES 672
The use of external data bases to extend current awareness services based on internal resources at AWRE Aldermaston P. D. FRIEND 678
External services in retrospective searching F. ROBINSON 686

ASLIB PROCEEDINGS

INDEX

Volume 24, 1972

010.5
As 52 Proc.
Vol 24
Jan - Dec.
1972

CALCUTTA UNIVERSITY

INDEX

- Aslib
  - *Aslib Book List*, 648
  - *Aslib Information*, 607
  - Branches:
    - Midlands, annual general meeting, 266; course, 4; East Midlands section, 73; visit, 492
  - Chairman of Council, 492
  - Conferences:
    - annual (1971) papers, 11–55, 79–138; annual (1972), 153, 316–17, 381–2, 608, papers, 654–95; information sources about the EEC in the United Kingdom, papers, 501–36;
  - Council, 380
  - 50th anniversary celebrations, 153
  - Groups:
    - *Aeronautical*, 5
    - *Audio Visual*, conference proceedings, 551
    - *Chemical*, annual conference, 437
    - *Computer Information Group*, annual conference, 317
    - *Co-ordinate Indexing Group*, annual conference, 609–10
    - *Electronics*, annual conference, 266
    - *Social Sciences*, 72–3, conference papers, 444–82
    - *Transport and Planning*, conferences (with LA), 317–18, proceedings, 493–4
  - Meetings:
    - annual lecture, 218; Aslib R & D Department, 551; computer-produced indexes, 265; data and the chemist, 436; electronic intelligent machines, 492–3; information analysis, 153; KWIC can be beautiful, 3; looking at libraries, 154; measures as management tools, 219; Oh! typography, 71; project SAPPHO, 648
  - New members, 217–18, 316, 607–8
  - Periodicals, 606
  - Research and Development Department, 437–8, 494; 'Summary of research undertaken by Aslib, 1966–1971', 199–204
  - Symposia:
    - tomorrow's information worker, 218–19, papers, 556–79; UDC: revise or relegate, 265–6
  - Visit, 3–4

Adams, S., Grey, J., Coblans, H., *and* Matthews, F. W., 'UNISIST: A forum', 111–22
'Administration of diffuse collections', 274–83
Advisory Group for Aerospace Research and Development, 322
American Chemical Society, 7
American Institute of Physics, 75–6
American Society of Information Science, regional conference, 157
'Analysing industrial information service costs: a simple check list', 635–9
Anderson I. G., *ed., Directory of European Associations*, 271
Archives of British Men of Science, 221
Armstrong, A., 'Analysing industrial information service costs: a simple check list', 635–9
Arnold, D. V., 'Structure of information services', 654–63
ASCA, 439
ASCATOPICS, 221
Ashworth, W., 'Administration of diffuse collections', 274–83
Association of Assistant Librarians, East Midlands Division, 6
L'automatisation documentaire en France et dans les pays d'expression, 8–9

Batty, D., 323
BioSciences Information Service (BIOSIS), 552–3
Bishop, D., 'Information flow in the construction industry: a study and the development of its recommendations', 79–95
Books in English, 5–6
Bottle, R. T. *and* Wyatt, H. V., *eds, The use of biological literature*, 158–9
Brimelow, T., 'What educational programme is required to produce the necessary specialists?: The programme that exists and omissions', 570–73
British Council, 441
British Library, ADP Feasibility Study, 614–16
'British Library and the social sciences: summary and conclusions', 480–82
'British Library of Political and Economic Science: Reference services', 459–63
'British Museum Library and the social sciences: Reference services', 449–58
British National Bibliography, 5–6
British Standards Institution, *Metric typographic measurement*, 157–8; *Microfilm in the office: an introduction to microcopying*, 442; *Presentation of research and development reports*, 322; *Recommendations for the presentation of theses*, 612
Brown, J. E., *The Canadian national scientific and technical information system*, 554
Buckland, M. K., 270–71

Calderhead, Patricia, *Libraries for professional practice*, 617
Canning House Library, *Portuguese and Spanish Dictionaries*, 78

Carter, Robert, *Communications in organizations: an annotated bibliography and source book*, 617
Cassell's dictionary of abbreviations, 498
Central Statistical Office, *List of principal statistical series and publications*, 442
Check List of Social Science Serials (CLOSS), 649
Cheeseman, L. C., 439
Chemical Abstracts Service, 158, 385, 552–3
Chemical and Plastics Industries Review 1972, 617–18
Chemical Industry Notes, 7
Chemical Insight, 221
Christophers, R. A., 'Retrospective bibliographical services in the social sciences', 470–72
Clarke, D. A., 'The British Library of Political and Economic Science: Reference services', 459–63
Coblans, H., *see* Adams, S.
College of Librarianship Wales, 384
Committee on Biological Information, 650
Commonwealth Library Association, 438
Conference of Industrial Research Associations, 267
Conference proceedings in the IAEA Library, 618
Conferences: European Congress on documentation systems and networks, 610; training in information work, 74; world micrographics, 322
Cook, J., 'Financing a library/information service by operating a cost recovery system', 342–9
Corbett, L., 'Problems in using external information services—attitudes of the special library and its users', 96–110
Course: Nature, use and organisation of statistical collections, 552
Courtaulds vocabulary of textile terms, 323
Current Contents, 439
Current Programs, 552

Davinson, D. E., 497
Delmas/Harrap Business Dictionary, 652
Department of Education and Science, 269–70; award, 497; Libraries Division, 76–7
Department of Trade and Industry, small firms centres, 551
'Desiderata for national bibliographical services', 473–9
Deutsche Forschungsberichte (*German Research Reports*), No. 1, 78
Deutsche Gesellschaft fur Dokumentation, Komitee Thesaurusforschung. *Zukunftsplanung in der Thesaurus—und Klassifikationsforschung*, 442
Dewey Decimal Classification, 18th edition, 267
Dictionary of science and technology, 159
Du Pont Company, 384–5

Ealing Technical College, School of Librarianship, 220
East, H., 381–2
Edwards, B. A., 'Future developments in information technology: 1. What equipment and systems can we expect in the 70s and beyond?', 11–21
Encyclopedia of Associations, 652
'Ergonomics and information systems'; 178–86
Exhibitions and conferences year book 1972, 324
'External sources of information—services available and criteria for evaluation', 664–71

FID, *see* International Federation for Documentation
'FID policy for the UDC', 222–5
'Financing a library/information service by operating a cost recovery system', 342–9
500 *largest companies in Norway, Sweden, Denmark, Belgium*, 498
Food and Agricultural Organization, 381–2
Ford, M., 'Technical Indexes System for the control of trade literature', 284–92
'Foreign language and translation problems of the social sciences', 233–43
Forest Press, 440
Foskett, A. C. 'UDC: Revise or relegate?: Conclusions, 592–4
Foster, J. J. *ed.*, *Legibility research abstracts, 1970*, 9
Fox, J. G., 'Ergonomics and information systems', 178–86
Friend, P. D., 'The use of external data bases to extend current awareness services based on internal resources at AWRE Aldermaston', 678–85
Fugmann, R., 'Theoretical foundation of the IDC-system: six postulates for information retrieval', 123–38
'Future developments in information technology: 1. What equipment and systems can we expect in the 70s and beyond?', 11–21; '2. The implications of future technology for tomorrow's information worker', 22–30

Gardin, J.-C., 7–8
Geoffrey Ford, M., 270
Gilbert, L. A. *and* Wright, J. W., *Non-book materials: their bibliographic control*, 385
Gilchrist, A., 'Intermediate languages for switching and control', 387–99
Gray, J., *see* Adams, S.

Hall, J., 'Information services in university libraries', 293–302
Harvard-Williams, P., 323
Harvey, Joan M., *Statistics Europe: sources for market research*, 159–60
Henderson, G. P., *European companies: a guide to sources of information*, 442–3; 'Information sources about the EEC in Europe: 2. Information on European companies', 532–6
Her Majesty's Stationery Office (HMSO), 383
Hertfordshire Association of Special Libraries, 497; annual conference, 156

INDEX

Humphreys, K. W., 'Other national resources in the social sciences', 464–9

IMEX, 318, 494–5
'Information flow in the construction industry: a study and the development of its recommendations', 79–95
Information Retrieval Ltd, 611–2
'Information services in university libraries', 293–302
'Information sources about the EEC in Europe: 1. Market information', 525–31; '2. Information on European Companies', 532–6
'Information sources about the EEC in the United Kingdom: 1. Government and official sources of information', 501–6; '2. Commercial and non-government sources of information', 506–13; '3. Law and taxation in the EEC and its member countries', 514–24
'Information work and workers in the coming decade: 1. Manpower requirements and training', 556–61; '2. Roles and systems: The need for change', 562–4
INSPEC, 438–9
Institute for Scientific Information, 221, 439
Institute of Information Scientists, annual conference, 74–5; Northern Branch, 495
Institute of Operational Research, 494
Institute of Physics, 268; *Research fields in physics at United Kingdom Universities and Polytechnics*, 499
Institution of Electrical Engineers, 75–6; Library, 496–7
'Interlibrary lending in the social sciences: a note', 445–8
Intergovernmental Bureau for Informatics, 495–6
International Book Year, 155–6
International Cataloguing, 7
International Federation for Documentation (FID), 157; FID/DC, 266–7; *Introductory course on informatics/documentation*, 219–20; 36th Conference and Congress, 154–5
International Federation of Library Associations (IFLA), 384
'International information networks: 1. The ESRO system', 31–7; '2. The International Nuclear Information System', 38–55
International Planned Parenthood Association, 8
International Standard Serial Numbers, 649
'Intermediate languages for switching and control', 387–99
Isotta, N. E. C., 'International information networks: 1. The ESRO system', 31–7

Jones, P. J., *see* Terry, P. J.
Juhasz, S. and others, *comps*, *Cinderella—author index practices and philosophies*, 272
Jungk, R., 'Future developments in information technology: 2. The implications of future technology for tomorrow's information workers', 22–30

Kabi, A., 'Use, efficiency and cost of external information services', 356–62
Kimber, R., 382–3

Lang, V., *see* Vernon, K. D. C.
'Librarians and the management of library systems', 229–32
Library Advisory Council for England, 496
Library Association, Cataloguing and Indexing Group, 73–4; Industrial Group, 497; Medical Section, 321; Research, Special and Information Section, 317–18, 493–4; Robinson Medal, 441
Line, M. B., 'Interlibrary lending in the social sciences: a note', 445–8
Lloyd, G. A., 'FID's standard reference code project and UDC improvement programme', 580–87
London and South Eastern Library Region, 440–41
'*London Classification of Business Studies* and management literature', 187–98
London Diplomatic Corps, Scientific Club, 153
'Looking at libraries', 627–34
Loveday, Anthony J., 270

Maclean, J., 'Information sources about the EEC in Europe: 1. Market information', 525–31
Malwad, N. M. *A selective bibliography on user needs for scientific and technical information*, 272
Marine Librarians' Association, annual conference, 611
Mason, D., 323
Matthews, F. W. *see* Adams, S.
Mayes, R., 'Information sources about the EEC in the United Kingdom: 1. Government and official sources of information', 501–6
Medical Library Association, 553
Muench, Eugene V. *Biomedical subject headings*, 226

National Council for Educational Technology, 650
National Federation of Science Abstracting and Indexing Services, 157
National Institute for Social Work Training, 495
National Lending Library of Science and Technology, *Current serials received by the NLL*, 9
National Reprographic Centre for Documentation, *Directory of commercial microfilm services in the United Kingdom*, 160
Neville, H. H., 'Thesaurus reconciliation', 620–6
Newcombe, D., 'SRC: Unverified assumptions': *Summary*, 587–90
New Year's Honours, 73

Nigerian Library Association, 270

Office for Scientific and Technical Information (OSTI), 3; awards, 76, 321, 439, 440–41, 651; research studentships and fellowships, 77, 270
100 centre guide to commercial property development 1972, 499–500
'Other national resources in the social sciences', 464–9
Overton, C. D., 'Value for money in Government library/information services', 325–36

'Patents as a source of technical information', 244–54
Paterson, G. D. L., 383
Patrinostro, Frank S., *A survey of automated activities in the libraries of the United States*, 226–7; *A survey of automated activities in the libraries of Great Britain and the Commonwealth countries*, 386
Pearce, J. G., 553–4
Pelzer, C. W., 'International information networks: 2. The International Nuclear Information System', 38–55
Pemberton, J. E., 'Printed ephemera in British libraries', 162–77; *The national provision of printed ephemera in the social sciences*, 160–61
Perry, B. J., 'Information work and workers in the coming decade: 1. Manpower requirements and training', 556–61
Petyt, K. M., 'Some recent approaches to the study of meaning', 412–18
'Place of professional education in higher education in the future', 565–9
Plenum Publishing Corporation, IFI/Plenum Division, 384–5
Polish Central Institute of Scientific, Technical and Economic Information, 77
Polytechnic of North London, School of Librarianship, research studies, 156, 320–21
'Printed ephemera in British libraries', 162–77
'Problems in using external information services—attitudes of the special library and its users', 96–110
Program, 382–3
Public Lending Right, 381, 546–51, 650

Ranganathan, S. R., 613
'Research and Aslib membership', 419–22
'Research by Aslib into costing of information services', 337–41
Retail trade developments in Great Britain 1971–1972, 9–10
'Retrospective bibliographical services in the social sciences', 470–72
Roberts, M. J. *and others*, *Construction Industry Thesaurus*, 618–19
Roberts, N., 'Desiderata for national bibliographical services', 473–9
Robinson, F., 'External services in retrospective searching', 686–95
Roland Smith, J., 'What is really wrong with the UDC?' 591–2
Royal College of Art, Readability of Print Research Unit, 321
Royal Society of Medicine, Library Section, 496

Saunders, W. L., 'The foreign language and translation problems of the social sciences', 233–43
Saunderson, K. M., 'Patents as a source of technical information', 244–54
Schur, H., 'What educational programme is required to produce the necessary specialists?: 2. education of information specialists for the 1970s', 574–9
Science Policy, 268
SCONUL Slavonic and East European Group, *Directory of libraries and special collections on Eastern Europe and the USSR*, 227
Scottish Library Association, annual summer school, 269
Sharma, P. N. *and* Ashton, P. W., 'An evaluation of International Patent Classification for information retrieval', 319–20
Sheehy, Eugene P., *Guide to reference books*, 554
Short course provision in information/library work and computer appreciation, 610
Smithsonian Science Information Exchange, 438–9
Smyth, A. L., 'Information sources about the EEC in the United Kingdom: 2. Commercial and non-government sources of information', 506–13
Social Science Documentation Centre, New Delhi, 438
Social Sciences and Humanities Citation Index, 320
'Some recent approaches to the study of meaning', 412–18
'Some thesauric history', 400–411
Sparck Jones, K., 'Some thesauric history', 400–411
Spinney, G. H. 'The British Museum Library and the social sciences: Reference services', 449–58
Stannett, A., *Bibliography on data co-ordination in the construction industry*, 500
Steiner, W. A. F. P., 'Information sources about the EEC in the United Kingdom: 3. Law and taxation in the EEC and its member countries', 514–24
Stern, B. T. 'Information work and workers in the coming decade: 2. Rules and systems: The need for change', 562–4
Stevens, C. H., 8
Strable, E. G., 441
'Structure of information services', 654–63
Sturt, R., 323; 'Teaching costing techniques to librarians and information scientists of the future', 350–55
Symposia: Documentation of the UN and other Intergovernmental Organizations, 156–7; Progress and prospects in agricultural librarianship and documentation, 651

INDEX

Tabs, 552
Taubert, Siegfried, *ed.*, *The book trade of the world*, 554–5
'Teaching costing techniques to librarians and information scientists of the future', 350–55
'Technical Indexes System for the control of trade literature', 284–92
Terry, J. E. *and* Jones, P. J., 'The use of external data bases to extend current awareness services based on internal resources at UKAEA Harwell', 672–7
'Theoretical foundation of the IDC-system: six postulates for information retrieval', 123–38
'Thesaurus reconciliation', 620–26
Thomas, A., 323
Thomas, P. A., 'Looking at libraries', 627–34; *and* Ward, V. A., 'Librarians and the management of library systems', 229–32
Thwaites, B., 'Place of professional education in higher education in the future', 565–9

Unesco, Department of Documentation, Libraries and Archives, 383
Union list of statistical serials in British libraries, 653
UNISIST, 6; 'UNISIST: A forum', 111–22
University College London, School of Library, Archive and Information Studies, 320
University of Lancaster Library Research Unit, 268, 440
University of London, Institute of Latin American Studies, 612
University of Maryland, School of Library and Information Services, 220–21
University of Warwick, 384
US National Commission on Libraries and Information Science, 8
'Use, efficiency and cost of external information services', 356–62
'Use of external data bases to extend current awareness services based on internal resources at AWRE Aldermaston', 678–85
'Use of external data bases to extend current awareness services based on internal resources at UKAEA Harwell', 672–7

'Value for money in Government library/information services', 325–36
Van Bol, Jean-Marie *and* Fakhjakh, Abdelfattah, *comps*, *The use of mass media in developing countries*, 619
Vernon, K. D. C. *in association with* Lang, V., '*The London Classification of Business Studies* and management literature', 187–98
Vickery, B. C., 'External sources of information—services available and criteria for evaluation', 664–71; 'Research and Aslib membership', 419–22; 'Research by Aslib into costing of information services', 337–41; *and* East, H., *Computer support for Parliamentary information service*, 437

Wadsworth, Jill *and* Glover, M. W., *comps*, *An index to the proceedings of the nine international congresses on high speed photography 1952–1970*, 555
Waley, D. P., 441
Ward, V. A., *see* Thomas, P. A
Weast, Robert C. *ed.*, *Composite index for CRC Handbooks*, 272–3
Wessex Regional Hospital Board, 76
West London College, Centre for Part-time librarianship, 269
Western Australian Institute of Technology, 270
'What educational programme is required to produce the necessary specialists?: 1. The programme that exists and omissions', 570–73; '2. Education of information specialists for the 1970s', 574–9
Whiteman, P., 323
Who owns whom (Continental edition), 227–8
Who was who, 1961–1970, 273
Who's who in finance, 443
Who's who of British Scientists 1971–72, 161
Wilson, A. T. M., Mitchell, Jeremy *and* Cherns, Albert, *eds*, *Social science research and industry*, 10
Wright, J. E., 553, 'The FID policy for the UDC', 222–5
Workshop: Audio-visual materials, 75
Wright, R. C., 492

Young, R. C., 382–3

CALCUTTA CENTRAL LIBRARY UNIVERSITY

Aslib Proceedings

incorporating Aslib Information

VOLUME 24 JANUARY 1972 NUMBER 1

© 1972 Aslib and contributors

Aslib Proceedings: incorporating Aslib Information *is published monthly and supplied free to members of Aslib. Subscription rates are £10 annually to non-members, or £2.50 to Aslib members requiring additional copies. Single copies £1, or 25p to members.*

Further information about Aslib's services and membership rates will be supplied on application to the Director, Aslib, 3 Belgrave Square, London SW1X 8PL. Tel. 01-235 5050. Telex 23667; answer-back, Aslib London.

ASLIB CALENDAR 1972

February

MON.7.	Co-ordinate Indexing Group evening meeting. Aslib. 5 for 5.30 p.m.
WED.9.	Economic and Business Information Group meeting: 'International product licensing'. Dept. of Trade and Industry, 26 Old Bailey, EC4. 3.15 p.m.
	Scottish Branch/Institute of Information Scientists joint meeting: 'Computer-based information services'. University of Strathclyde. 6 p.m.
	Aslib evening meeting: 'KWIC can be beautiful', by Dr F. W. Matthews. Aslib. 5 for 5.30 p.m.
TUE.22.	Midlands Branch afternoon workshop: 'Forward planning as related to library and information activities', by Mrs E. Mack, Mrs J. Aitchison, and Mr H. H. Goom. Arden Hotel, Birmingham. 2.15 p.m.
THU.24.	Aslib visit: 'Computer publishing systems'. Oxford University Press, Neasden. 10.30 a.m.
FRI.25–SUN.27.	Engineering Group Conference: 'Costing library and information services'. Dunchurch Industrial Staff College, Nr Rugby.
TUE.29.	Computer/Data Processing Group evening meeting: 'Editorial policy and problems of some computing abstracts services'. Aslib 5.30 p.m.

March

THU.2.	Audio Visual Group Annual General Meeting. Aslib. 5.30 p.m.
SAT.4–SUN.5.	Social Sciences Group Annual Conference: 'The British Library and the social sciences'. Bath.
WED.8.	Economic and Business Information Group meeting: 'Is there too much management literature?' Management Book Centre, Claude Gill Books, Oxford Street, W1.

Calendar (*cont.*)

MON.13.	Co-ordinate Indexing Group meeting. Aslib. 3.30 p.m..
WED.15.	Aslib evening meeting. Speaker: Charles Gibbs-Smith (Emeritus Keeper, Victoria and Albert Museum). Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1. 5 for 5.30 p.m. Midlands Branch and Midlands Regional Liaison Office one-day course: 'Financial and commercial information'. Chamber of Commerce, Harborne Road, Edgbaston, Birmingham.
FRI.17.	Scottish Branch Annual General Meeting and Conference: 'Library Management'. West Park Hall, University of Dundee.
THU.23.	Midlands Branch Annual General Meeting and buffet. Engineering and Building Centre, Birmingham.

April

THU.6.	Aslib visit to NRLSI, Bayswater Division, W2. 4.30 p.m.
SUN.9–WED.12.	Chemical Group courses: 'Introduction to modern methods of chemical characterization', Kingston Polytechnic, Kingston-upon-Thames; 'Nature and language of chemistry', Courland Grove Hall, London SW8.
WED.12–FRI.14.	Co-ordinate Indexing Group Annual General Meeting and Conference: 'Words and meanings: the whole problem of the thesaurus for co-ordinate indexing'. Churchill College, Cambridge.
TUE.18.	Midlands Branch evening meeting: 'Current awareness—cost and effectiveness', by A. E. Cawkell. Arden Hotel, Birmingham. 6.15 p.m.
WED.19.	Aslib evening meeting: 'Information analysis', by Dr P. Leggate (Oxford University). Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1.

ASLIB INFORMATION

Government grant to Aslib 1972–74

New terms of grant for the above period have been offered by OSTI and accepted by Aslib. These grants are in four sections: income-related grants for support of (a) Aslib's general range of activities and (b) its general research programme; and expenditure-related grants for (c) the experimental development and evaluation of new services and (d) contracts for research projects commissioned by OSTI.

In order to qualify for the income-related grants, Aslib must raise in 1972 not less than £65,000 in grant-earning membership subscriptions from UK sources (a wider range of UK subscriptions than in the past has been ruled to be 'non-grant-earning' because the organizations concerned receive grants themselves from Government sources), and such income up to a maximum of £75,000 could qualify for grant. The qualifying range in 1973 is £70,000 to £80,000, and in 1974, £75,000 to £85,000.

If all the criteria laid down in the terms and conditions are met, the total of OSTI grants could range from a minimum of £77,250 in 1972 to a maximum of £102,500 in 1974. These figures are to be compared with a maximum of £65,000 in 1971. This increased contribution in present economic circumstances is gratifying evidence of the Government's continuing confidence in Aslib's effectiveness and leadership in the library and information field.

KWIC can be beautiful

At an Aslib evening meeting to be held on Wednesday, 9th February at Aslib Headquarters, Dr F. W. Matthews, Head of the Central Technical Information Unit at ICI Ltd, will propose that 'KWIC can be beautiful'.

Automatic indexing from text is the 'golden fleece' toward which many information systems designers struggle. One of the simplest, cheapest, and often the least satisfactory, methods is KWIC (*K*ey*w*ord *i*n *C*ontext). With forethought very useful indexes can be created, often in areas where cost limitations prevent the use of more sophisticated methods. The concepts of 'instant file', 'columnar KWIC' and 'electronic notebook' will be discussed using examples from the large number of such indexes which have been developed in the ICI Group of companies.

Chairman of the meeting will be Miss Helen Townley of IR Advisory Services, West Wickham. Tea will be served at 5 p.m. and the meeting will begin at 5.30 p.m.

Aslib visit to OUP computer system

Aslib has arranged a morning visit for members to the Oxford University Press computer system at Press Road, Neasden, London NW10, to take place on Thursday, 24th February.

The first book was printed in Oxford in 1478 and Oxford University Press is now one of the largest publishers in the world. The warehouse receives and despatches about 16 million books a year.

In 1962 the Delegates of the Press accepted a recommendation that OUP should undertake a 'feasibility study' of the possibility and advantages of using an integrated Data Processing System. The result of this study was a decision to set up an Electronic Data Processing Department with an ICT 1500 computer to be installed in January 1965. In fact, lift-off did not take place until August 1965 and the only major achievement between then and April 1966 was the transfer of the Sales Ledger from National Accounting Machines to the computer. Meanwhile, the rapid advance in computer design and a far clearer idea by OUP of what future conversion of their procedures would entail resulted in the replacement of the ICT 1500 by a 1903 with 8 × 20 kc tape decks, a high speed printer and a high speed paper tape reader. The change of system, which included re-writing all programs in Cobol, was effected by February 1967. In 1970 Visual Display Units replaced punched paper tape for the bulk of the input, two disc drives were added and a 1901A installed in addition to the 1903.

Visitors to Neasden will be shown the various systems now in operation, which take care of input of orders, invoicing, maintenance of the sales ledger, stock control and housekeeping, stock review, royalty calculations, printing and binding recommendations, costing, trade expenses and trading accounts, stock valuation, publicity mailing and journal subscriptions.

The size of the visiting party will be strictly limited to twenty-five members, and successful applicants will be advised. Applications should be received by the Meetings Organizer at Aslib no later than 17th February.

Course on financial and commercial information

The Aslib Midlands Branch and the Aslib Midlands Regional Liaison Office are organizing a one-day course on the collection, interpretation and presentation of financial and commercial information, to be held on Wednesday, 15th March 1972, at the Chamber of Commerce and Industry, Harborne Road, Edgbaston, Birmingham.

The Course is intended for librarians, information officers, market researchers and others who wish to improve their knowledge of sources of financial and other company information and would like to increase their understanding of information published in Annual Reports and Accounts. The presentation of such information to management in the form of current awareness bulletins etc. will also be covered. Adequate time will be allowed for discussion and the course will conclude with a forum at which questions and comments will be encouraged.

Speakers will include: A. G. Piper (Senior Lecturer, Department of Accounting, University of Birmingham); A. L. Smyth (Commercial Librarian and Information Officer, Manchester Public Libraries); T. P. S. Tweedie (Information Scientist, Unilever Research Laboratory, Bedford); and G. P. Henderson (Director, CBD Research Ltd, Beckenham).

The course fee is £9.25 (£8.00 to Aslib members). Further information is obtainable from K. L. Wakelam, Aslib Midlands Regional Liaison Office, Engineering and Building Centre, Broad Street, Birmingham B1 2DB. Tel. 021-643 1914.

Aeronautical Group

At the Annual General Meeting of the Aeronautical Group, held at its 20th Annual Conference in July 1971, it was decided to wind up the affairs of the Group. While this move was regretted, it appeared inevitable because of a decline in active membership. This, in its turn, was the result of the mergers, take-overs and other factors affecting the size and scope of the aircraft industry, which no longer offered a basis broad enough to sustain such a group.

Over the past twenty years, the Aeronautical Group has contributed much to Aslib and has an enviable record of achievement, including twenty successful Annual Conferences, and has fostered a spirit of mutual co-operation which may prove of benefit to the other Groups which Aero Group members now elect to join.

Northern/Midlands Branch Joint Conference

Members are asked to note that the reference made in the November issue of *Aslib Proceedings*, page 567, to the forthcoming Joint Northern/Midlands Branch Conference was incorrect in listing Miss M. Webb as a speaker. Mr Michael Hill, Keeper, NRLSI, will in fact be taking part and speaking on the work of the NRLSI in relation to the local information unit.

New bibliographical tool—*Books in English*

The British National Bibliography recently launched a new bibliographic publishing venture called *Books in English*. This lists, in a single sequence of authors and titles, every book in the English language currently catalogued by BNB and the Library of Congress. It is published bi-monthly in ultramicrofiche form on 6 in. × 4 in. transparencies which are read in a PCMI reader supplied by the National Cash Register Company. The distinct advantage of *Books in English* is that major cumulations can be published within a month of the last book titles being recorded, instead of the many months demanded by the conventional printing methods.

The new service is the result of two years' development and evaluation in which fifty specially selected libraries took part. Included amongst these was the Aslib Information Department, where the publication proved to be extremely useful in answering members' enquiries. The Department has since decided to place an annual subscription to the service.

The basis of the system is the computer originated BNB and Library of Congress MARC records on magnetic tape. Once a single tape is produced containing the final listing from both sets of records, this tape is then converted to microfilm by reading the tape through a COM device. The microfilm is then further reduced on NCR's unique PCMI camera providing 2,380 pages to a transparency. The transparency is then viewed in the PCMI reader with a magnification factor of 150×.

Books in English costs £100 per annum, for which subscribers receive six progressive cumulations of the publication. The NCR PCMI readers can be purchased for £313 (there is a 12½ per cent educational discount on this price); or a limited-quantity initial offer of reconditioned readers are available at £198. The readers can also be rented at £69 per annum. For further details concerning the reader contact Mr F. R. Gameson, Press Officer, National Cash Register Company Ltd, 206 Marylebone Road, London NW1 6LY. The order form for *Books in English* can be obtained from the BNB, at 7 Rathbone Street, London W1P 2AL.

UNISIST Proceedings

Since 1967 Unesco and the International Council of Scientific Unions (ICSU) jointly have carried out a feasibility study on a world science information system based on the co-ordination of existing, mainly national networks, and voluntary co-operation through standardization and exchange. The assembled information, analyses and recommendations, which resulted from the meetings of the UNISIST Central Committee and its subsidiary bodies, were integrated into a comprehensive Study Report which appeared early in 1971 (see review in *J. Doc.*, **27**, 3, September 1971, p. 216–20).

The Study Report provided the key working paper for the Unesco Intergovernmental Conference which met in Paris in the first week of October 1971 and in which delegates from eighty-three countries participated. The Conference approved of the setting-up of UNISIST within the Unesco structure. (The forum on UNISIST held at the 45th Aslib Annual Conference in Darmstadt will be reported in the February issue of *Aslib Proceedings.*)

The Proceedings include the most important parts of the rather extensive documentary record—the agenda and reports of the Central Committee, reports from the six Working Groups and the Advisory Panel, as well as special studies by individuals on specific aspects of world documentation. They have been published in only one form, a microfiche edition of thirty-one microfiches, and these have been deposited in key libraries all over the world. A set of the microfiches can be consulted in the Aslib Library. Sets can be obtained from the Service de Photographie, Centre de Documentation, CNRS, 15 Quai Anatole France, Paris 7°. The price is 120 francs per set.

Information services for local government

Many librarians are already providing information services for local government, and many others are considering doing so, as they look at the needs of the new authorities which will be set up in 1974. The East Midland Division of the Association of Assistant Librarians is holding a meeting on this subject at 2 p.m. on 15th March 1972 at County Hall, Glenfield, Leicester, and a discussion/seminar is being held in the morning to provide an opportunity for people working in this field to pool their experiences and ideas, to discuss a pattern of development for the future and to look at the relationship between information services for both local and central government.

The programme for the meeting will include a display of relevant leaflets, booklists, bulletins, etc. and librarians are invited to send copies of any material which they have produced to Mrs Madeleine Cooke, Leicestershire County Library, Clarence Street, at Lee Circle, Leicester LE1 3RW. Tel. Leicester 22012 (Ext. 30), Telex 34307, from whom full details of both meetings are available.

International cataloguing

The newly formed International Federation of Library Association's Committee on Cataloguing, which is based at the Department of Printed Books in the British Museum (see *Aslib Proceedings*, August 1971, p. 392), will shortly be issuing the first issue of its quarterly bulletin, *International cataloguing*. The new bulletin is designed to disseminate news of cataloguing activities and work in progress in all parts of the world; it will also include articles dealing with particular cataloguing problems and their solutions.

The proposed contents of the first issue will include: an article by J. McRee Elrod on the problems of cataloguing the multi-language, multi-script library (paper first presented at the IFLA Conference in Liverpool last year); notes on the cataloguing of African names; news of national cataloguing committees, conferences, publications etc.

The annual subscription for four issues is £2.00 (28 French francs or $5.25). All inquiries concerning subscriptions, contents, and also news items to be included in the Bulletin, should be sent to: Mrs Dorothy Anderson, Executive Secretary, IFLA Committee on Cataloguing, c/o Department of Printed Books, The British Museum, London WC1B 3DG.

Chemical Industry Notes from ACS

The American Chemical Society has recently launched a new information service for management personnel in the chemical and related industries.

The new publication, the first issue of which appeared on 6th December 1971, is entitled *Chemical Industry Notes*, and will provide a weekly digest of and index to business and technical news items of potential interest to those with corporate management, investment, marketing, and production management responsibilities in the chemically based industries.

Information for *Chemical Industry Notes* is taken from thirty-seven newspapers and periodicals published in the US, Canada, Britain, Japan, and New Zealand. The list will include general and business publications such as the *New York Times*, *Wall Street Journal* and the *Journal of Commerce*, as well as US, European and Japanese chemical news magazines and selected trade publications serving the adhesives, chemical processing, paper, petroleum, pharmaceutical, plastics, rubber, and textile industries in the US and abroad.

For further information about the new service, write to: The Marketing Department, Chemical Abstracts Service, Columbus, Ohio 43210, USA.

Special lectures by J.-C. Gardin

At the invitation of the University of London, Monsieur Jean-Claude Gardin of the Centre National de la Recherche Scientifique, Marseilles, who is well known in Britain for his work on SYNTOL and for his advocacy of UNISIST, will visit London during February to give two Special University Lectures:

Wednesday, 23rd February—Linguistics and documentation.
Monday, 28th February—UNISIST—the proposed world science information system.

Both lectures, which are open (no tickets required) to all who may be interested, will be given in the Gustave Tuck Theatre, University College London, at 5.30 p.m. The Reader in Information Studies, Mr B. C. Brookes, will preside.

Special collections on population and family planning

The International Planned Parenthood Federation (IPPF) has announced that any library having or wishing to establish a special collection of population and family planning material may apply to the IPPF library for lists of spare books and spare periodicals which are surplus to their requirements. Priority will be given to libraries of developing countries. The head offices of all IPPF member family associations will have already received these lists. Surface postage will be paid by the IPPF. The address of the IPPF is: 18–20 Lower Regent Street, London SW1Y 4PW.

People and places

CHARLES H. STEVENS, Associate Director for Library Development, Project INTREX, at the Massachusetts Institute of Technology, has been appointed the first Executive Director of the US National Commission on Libraries and Information Science. Mr Stevens, who has been on the staff of the Project INTREX (INformation TRansfer EXperiments) since its inception at MIT six years ago, was formerly Director of Library and Publications at MIT's Lincoln Laboratory, Lexington, Mass.

The US National Commission on Libraries and Information Science, which has only recently come into being, was created by act of the 91st Congress in July 1970 in response to the multitude of problems facing library systems throughout the country. It is charged with developing plans, studies, and analyses with librarians and others interested in information problems in the various library systems that exist in federal, state, local, and private agencies, and with advising the President and the Congress on overall policies to meet national needs for library and information services.

No booby traps?

An item sent in by a member taken from a recent issue of *International Herald Tribune* reads as follows: 'Burglars broke into a municipal library in Tel Aviv Sunday but didn't take a single book, Israeli police have reported. Purloined, however, were 1,000 copies of Playboy magazine'.

BRIEF REVIEWS

L'AUTOMATISATION DOCUMENTAIRE EN FRANCE ET DANS LES PAYS D'EXPRESSION FRANÇAISE. Documentaliste, 1971 (numéro spécial, hors-série). 96 pp.

Five years ago the Association française des Documentalistes et des Bibliothécaires spécialisés (a sort of French Aslib) produced the first of such inventories of activity in computerized documentation. The present issue describes some fifteen services mainly in industrial, commercial and legal enterprises, as well as in housekeeping routines in university libraries. At the international level the

ESRO and ILO systems are also described. There is a bibliography with 236 references covering the literature, mainly in the French language, since 1967.

DEPARTMENT OF EDUCATION AND SCIENCE. National Lending Library of Science and Technology. Current serials received by the NLL, March 1971. London: HMSO, 1971. 540 pp. £3.15. (SBN 11 270187 6)

This new edition has recently been received and should prove a useful addition to the Aslib Information Department. It contains nearly 36,000 serial titles in the fields of the natural sciences, the technologies and the social sciences, over three thousand more than in the previous edition published in 1967. Approximately a third of the titles in the present list were not included in the earlier edition. This is accounted for by the expansion of the collection and the rate at which serial titles change.

One of the difficulties experienced by the National Lending Library is discovering new serials as soon as they are published. The library would welcome information or samples of new serials published in any part of the world. Correspondence should be addressed to: The Director (Selection), National Lending Library for Science and Technology, Walton, Boston Spa, Yorkshire, LS23 7BQ, Great Britain.

FOSTER, J. J. *ed.* Legibility research abstracts, 1970. London: Lund Humphries, 1971. £2.25.

There is considerable difficulty in keeping track of the literature of marginal subjects, which are usually characterized by information widely scattered in many fields. Therefore this initiative, in which the Association Typographique Internationale and the *Journal of typographic research* have combined with Messrs. Lund Humphries to produce this new annual service, is greatly to be welcomed.

The Editor explains the scope as 'the different typographical methods of communication' with the inclusion of 'fringe areas such as the study of eye movements in identifying symbols, . . . ability to identify words from only a few letters, the effects of colour coding on certain tasks, the relationship between perceptual abilities and reading performance, and the comparison of reading with other methods of communication.' This issue contains 234 abstracts of articles (and a few books and reports) chosen from sixty-two periodicals published mainly in Europe and North America in 1969 and 1970.

RETAIL TRADE DEVELOPMENTS IN GREAT BRITAIN 1971–1972. London: Gower Press, 1971. 375 pp. £16.50. (ISBN 07161 0082 3). *Gower Economic Publications.*

This review is divided into three parts, corresponding to the overall objectives of the study on which it is based: Part One covers the identification of the developments in retail trading and the shopping environment; Part Two is concerned with providing specific forecasts and information on changes within the regions and major centres; and Part Three aims to assess and review the trading of the main companies in this sector.

The volume provides a thorough economic analysis of national and local retailing, its present and future prospects, and as such will be very useful to companies in the distributive industries, market research agencies, town planners, and so on. The drawback to its use as a handy reference book in information work is the lack of an index, although the contents list and particularly the guide to illustrations are quite detailed.

WILSON, A. T. M., MITCHELL, JEREMY *and* CHERNS, ALBERT *eds.* Social science research and industry. London: Harrap, 1971. 439 pp. £7.50. (ISBN 0 245 50657 8)

Although not apparent from the title the major part of this publication is a directory of organizations undertaking social science and economic research which is relevant to industry. The organizations in the directory are divided into the following categories and then listed alphabetically by title: government departments and public bodies; universities and colleges; independent institutes; firms and consultants; trade unions; societies and professional organizations.

The information given in each entry usually includes the address and telephone number, the name of the person to whom enquiries should be addressed, general research activities, brief details of research of particular interest to industry, education and training courses, and publications. The section on societies and professional organizations also gives information on the body's membership qualifications and subscriptions, purpose, activities, library and information services. Almost all the organizations in the directory are British but for some reason a few foreign ones are included such as the National Science Foundation and the Gemeenschappelyk Institut voor Toegepaste Psychologie. Also included is an alphabetical bibliography of relevant periodicals which indicates for each title the publisher, price and subjects covered. There is a list of United Kingdom scientific counsellors abroad and overseas scientific representatives in the United Kingdom in High Commissions and Embassies. Three indexes are included: an organizations and titles index, name index and research topics index.

At the beginning of the book are four introductory articles on the use of social science research to industry and notes for the guidance of companies contributing information to, or employing, an outside research team. This directory gives good coverage to a field in which little information is at present available.

Future developments in information technology

1. WHAT EQUIPMENT AND SYSTEMS CAN WE EXPECT IN THE 70s AND BEYOND?

B. A. Edwards

Standard Telecommunications Laboratories Ltd

Paper presented at the 45th Aslib Annual Conference, Darmstadt, West Germany, 10th–14th October 1971

Introduction

Before attempting a projection into the future it is probably best to discuss the framework of the present telephone network for the benefit of those without a background in telecommunications. We can then examine the direction of current technological developments as a basis for predicting the structure of the communications network of the future. The trend in terminal instruments is worthy of special examination since this is the point at which Aslib, as users, interface with the network. Finally we examine the actions required in telecommunication research, and the role the information worker can play, in order to further the introduction of some of these future equipments, systems and services.

Background

Early communications started with direct (or 'dedicated') connections between users, but quickly moved on to the use of manual interconnection points (exchanges) of the type shown in Figure 1. Manual exchanges were in due course superseded by automatic exchanges and 90 per cent of the telephone services in the United Kingdom are now provided by automatic exchanges. However, in many ways the facilities provided by automatic exchanges are less extensive than those provided by a manual service, and developments are under way for stored-program-controlled exchanges which will enable many of the manual facilities to be provided automatically. Typically these are the transfer or 'follow-me' service for the transfer of incoming calls as the user moves within the network, and abbreviated dialling for numbers called frequently.

The structure of the telecommunication network is shown in Figure 2. Subscribers are connected via dedicated cable on poles, or in the ground, to their own individual termination on a Local Exchange (LE). The LE would typically be located less than three miles away in the village, town, or district in the case of large cities. The LE is connected, usually by cable, to other local exchanges between which there is a large community of interest, and to a Group Switching

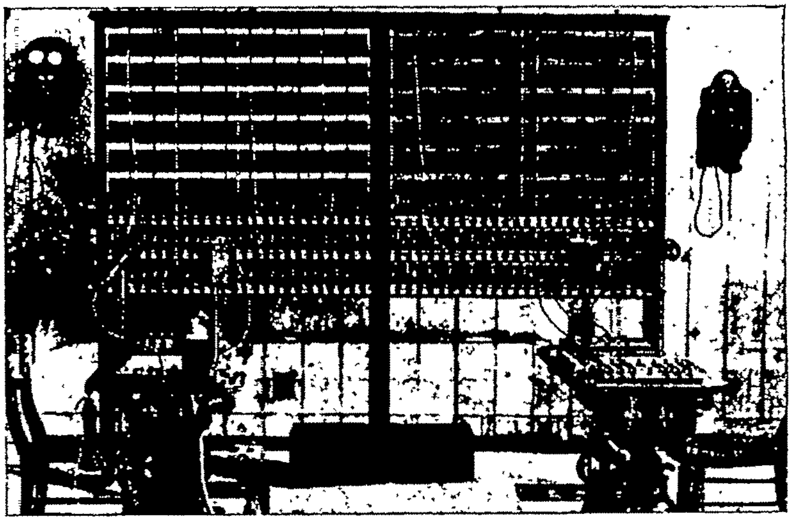


FIG. 1: *Colman Street. London's first Telephone Exchange 1879*
(Reproduced by courtesy of Mr J. S. Whyte, British Post Office)

Centre (GSC). The interconnections are referred to as junctions. The GSC is located typically in the county town or city centre. All long-distance calls are routed through the GSC. GSC's are interconnected via the trunk network. Connections also go from the GSC to main and international exchanges.

Since the average domestic subscriber uses his telephone for only short periods—about three minutes an hour in the busy hour of the day—the utilization of the equipment dedicated to him is only something like 5 per cent. The high probability that relatively few subscribers will be making calls at the same time enables us to capitalize on this at the local exchange by passing each subscriber line through a concentration stage. The efficiency at the output of the concentration stage is something like 50 per cent which effectively gives

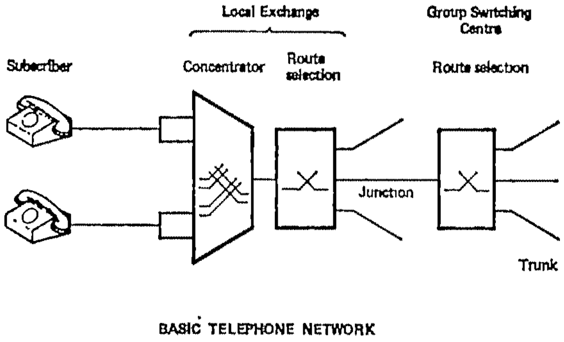


FIG. 2: *Configuration of basic telephone network*

us a 10 to 1 concentration in the first part of the local exchange. (This process does result in a small probability that some subscribers may not get service when they require it.) From this point on, all further switching equipment, in the local exchange and elsewhere in the network, at the group switching centre and main switching centres, is used essentially to route the call to the terminating local exchange over the best route available.

The capital costs associated with a network (see Table 1) reflect this shared usage beyond the local exchange and the fact that most calls are completed in the local area. Table 2 shows that within the local area the greatest capital cost item is the local cable between the subscriber and his local exchange. This is an interesting and important point to bear in mind when we look at the part of the network on which technology is finding its early applications. Other interesting and pertinent statistics are that the total capital investment in 1971 of the UK Post Office is £2,250M, and that the growth rate for telephony is about 7 per cent per annum. Telex growth is higher at 17 per cent. Data has too small a base for accurate prediction at the present time, but the low-speed data growth is higher than telex.

TABLE 1: *Percentage breakdown of network capital costs*

	Per cent
Local line	31
Local exchange	23
Junction transmission	26
Trunk switching	8
Trunk transmission	12

Cables buried in ducts at the side of the road form the usual connections between local exchanges and GSC's. Between GSC's and elsewhere in the trunk network one has the choice of cable routes (usually coaxial or low-loss cable), microwave radio; and on international routes submarine cables and satellite systems.

TABLE 2: *Percentage breakdown of local area capital costs*

	Per cent
Subscriber's terminal	10
Local cable	60
Local exchange	30

Impact of technology

Recently, in order to get more capacity out of the cable already installed in the ground, Administrations have looked for methods of transmitting a number of telephone messages over one pair of wires in a cable. This problem has been resolved by transmitting the signals over the cables in digital form, by which I mean that the signal takes a number of discreet levels as distinct from a continuous but complex waveform, i.e. analogue transmission. In the simplest case the signal has two levels, so that at the distant terminal it is necessary only to make a decision as to whether the signal is present or absent, which requires very little differentiation between the signal and the noise, the latter being a fundamental limitation on the previous transmission method. Two-level

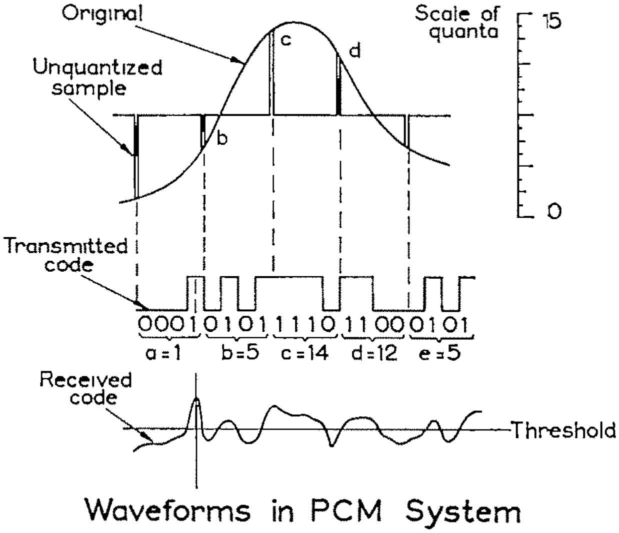


FIG. 3 (i): *Waveforms in PCM Systems*

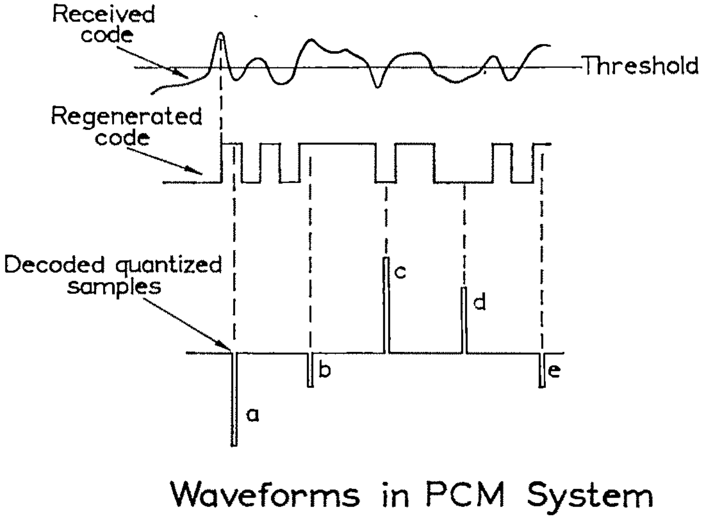


FIG. 3 (ii): *Waveforms in PCM Systems*

transmission is said to be binary and a single pulse or digit is referred to as a binary information digit or bit.

Some signals are generated directly in digital form. However, the principal signal carried today, the voice signal, is generated in analogue form. Figures 3(i) and 3(ii) show how an analogue speech signal is converted into digital form for transmission over the line and then converted back into its analogue form at the distant terminal. The signal at the instant 'b' has an amplitude equal to five on the 'scale of quanta' and is transmitted as a coded (digital) signal representing this value. This process is known as pulse-code modulation (p.c.m.). Speech transmitted in this way requires 64,000 bits per second of transmission capacity since the input is sampled 8,000 times a second and requires 256 (2^8) quanta or 8 bits per sample. Obviously a considerable amount of coded data information such as is used by the computer industry could be transmitted over such a channel. By comparison a telex message is transmitted at only 50 bits per second.

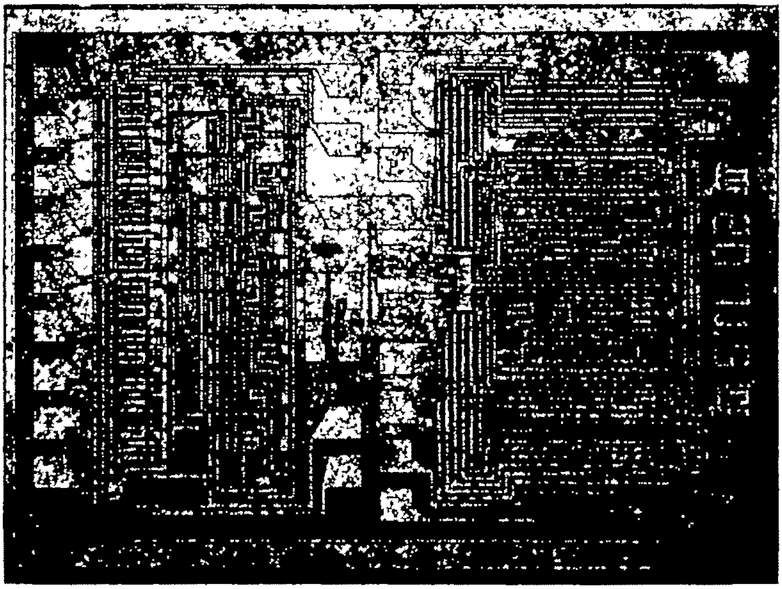


FIG. 4: *Detail of large scale integrated circuit*

Transmission systems using pulse code modulation are finding increasing use on the junction network and on trunk circuits between GSC's.

Once the intelligence is in the digital form, use can be made of large scale integration and other semi-conductor techniques to result in equipment occupying very low volume, dissipating very little power and, provided they are required in sufficiently high volume, at low cost. Figure 4 shows a 70 ml × 90 ml chip containing two 8-bit digit distributors such as would be used to provide a count of 8 for coding a voice sample. Five years ago this circuit would have required a card about 4 inches × 3 inches and ten years ago probably eight cards of the same size. Figure 5 shows how a number of such chips are manufactured on a 2 inch diameter slice. In general terms it can be said the process of manufacturing this 2 inch slice is no more complex than that required to manufacture a single transistor.

Another development which we can make use of, once information is transmitted in digital form, is the optical fibre cable. A single glass fibre approximately 20 microns in diameter could be used to handle as much as 1×10^9 bits per second. A cable made up of a number of such fibres could be a commercial proposition by the early 1980s.

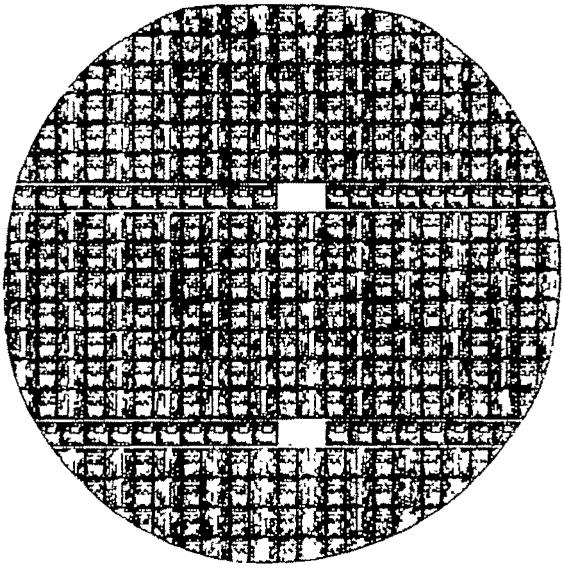


FIG. 5: *Slice of integrated circuits*

Once the transmission plant becomes digital in operation the telephone exchanges will also be constructed using digital techniques so that intelligence would pass through the network entirely in digital form. Thus by the late 1980s, early 1990s, a considerable portion of the telephone network will probably be digital in operation. Unfortunately most of these changes will occur in the junction and trunk network so that the capital cost of the subscriber's network and local exchanges will become an even more significant part of the total in this time frame. Later, new techniques such as the 'Ring Main System' in which a single high capacity cable is routed consecutively to a number of subscribers will help alleviate this unbalance.

Developments in terminal devices

During the 1970s a number of new terminals will appear for connection to the developing network. Figure 6 shows a conventional telephone modified to have

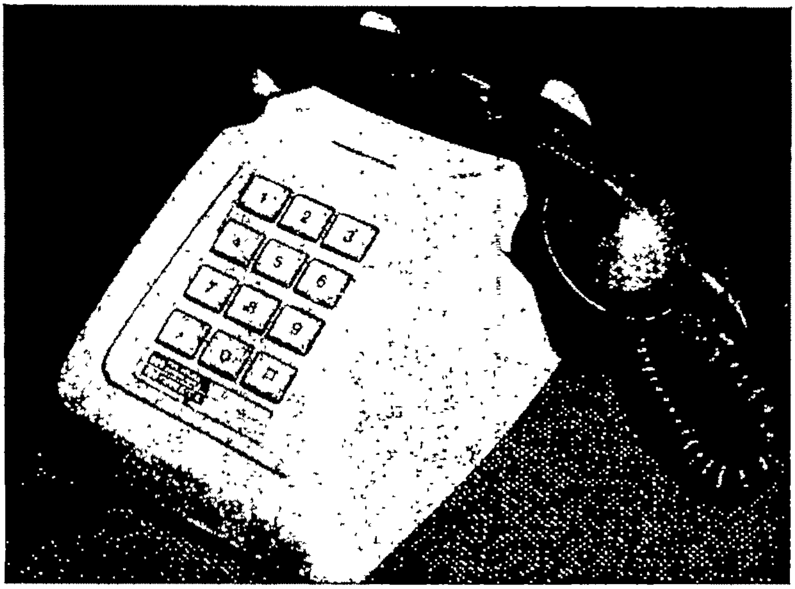


FIG. 6: *Push button telephone*
(Reproduced by courtesy of Mr J. S. Whyte, British Post Office)

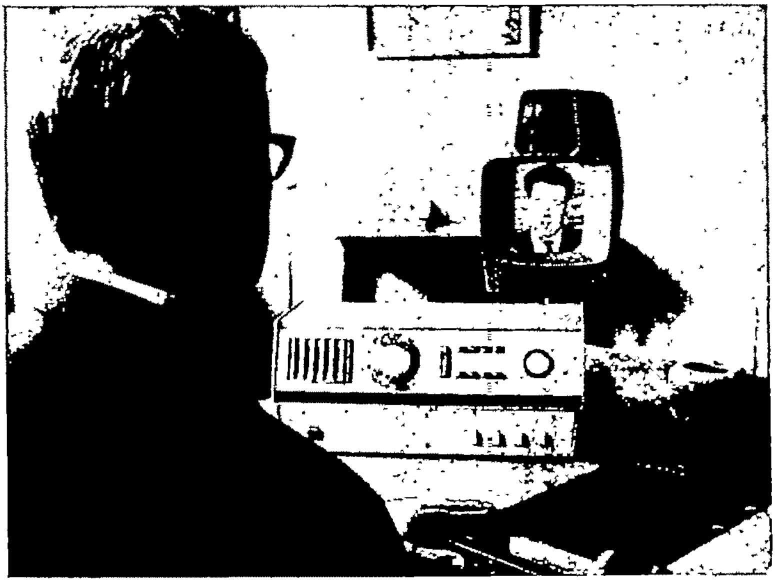


FIG. 7: *Viewphone terminal*
(Reproduced by courtesy of Mr J. S. Whyte, British Post Office)

a push button keyblock instead of the usual dial. One of the advantages of such an instrument is that is can be used to send information to a special receiver at the distant end after the call has been established. This means that the user could make a call and, once the connection is established, convey numerical information to the other end. Within limitations additional buttons could be provided, if required, to give a limited alpha numeric capability.

Another well reported terminal development is the video-phone terminal (Figure 7). These have been developed in a number of countries including the USA and the United Kingdom. Typically the display is about 10 inches × 8 inches and the picture definition is 270 lines per frame. Video-phone terminals are being developed for face to face, conference and document transmission. However, the bandwidth required to transmit a video-phone picture is 250 times that required for speech (or 100 times the digit rate of p.c.m. speech). It is difficult to foresee a capital cost per terminal of less than 100 times that of a telephone and, despite predicted decreasing cost of transmission facilities, the per call costs will still be significant. It is interesting to note that in the United Kingdom there are 5.9 domestic television sets compared to only 2.9 domestic telephones. The television set has exceptionally good display capability but of course at the present time can only receive on a broadcast basis. However, it is reasonable to expect that means will be developed for selective calling to the domestic television set in order that it may be used as a video terminal.

FIG. 8: *Visual display unit*

The display terminal used in the commercial world is the visual display unit. Figure 8 shows a visual display unit being used as a reactive terminal with a computer. The output from the computer, either in the form of alpha numeric information or in the form of diagrams, is displayed on the screen in front of the operator. The visual display unit has a keyboard with which the operator initially selects the display he requires and subsequently adds to or modifies the display. Sometimes in connection with this operation he will use a light pencil. This is a device containing a photo sensitive cell and when energized by the scan, position of that point, in terms of the x and y co-ordinates are conveyed to the computer. Then by the use of the keyboard the operator can erase the information or ask for it to be stored in a specified location.

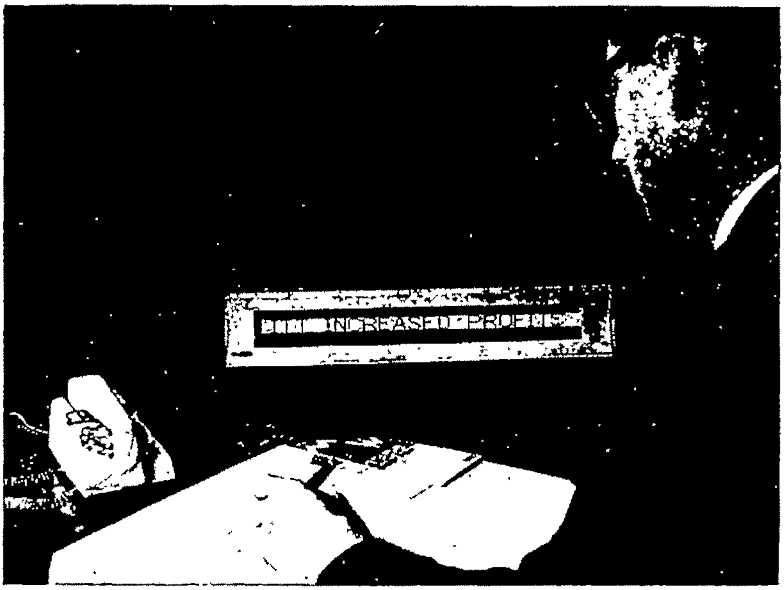


FIG. 9: *STL facsimile equipment*

The keyboard that I mention in connection with the visual display unit can of course stand on its own, in which case it would be similar to a teletypewriter. In this form it enables an operator to convey, in alpha numeric form, information to another terminal in the network; either another teletypewriter or a computer. Modern typewriters contain increasing quantities of electronic equipment and the direct output of ordinary electrical typewriters, as used by most secretaries, could eventually be transmitted directly to line.

The last terminal device which I would like to discuss is the facsimile machine used for document transmission (Figure 9). The newspaper industry represents one of the largest single markets for facsimile transmission systems. Newspaper pages must be transmitted at very high resolution rates, of the order of 1,000 lines per inch, in order to maintain sufficient standards of quality for half tone pictures. A system required only to transmit alpha numeric information or graphical material will require a definition of about 200 lines per inch. The trend in facsimile equipment is that a digital method of transmission will be used in which electrical scanning is used over a row of exceedingly small diameter heads. A facsimile equipment has been developed at STL with a speed capability of 8 million dots per second. If used in conjunction with a character translator it could print 12,000 lines of characters per minute.

Implications of new terminals

Armed with all these terminal devices, how could they be used to provide a public information retrieval service? Coded requests could be sent by telephone to indicate to a central service specific areas of interest. This is something which would be available from a number of exchanges within the next four or five years. Unfortunately it is limited to digital inputs only, i.e. the normal output from the dial. The response to such a request could be in the form of a recorded announcement such as that we are used to receiving when we use the 'Weather Information', 'Recipes for the Day', or 'What's on in London', services. A more sophisticated receive terminal would give us a transient visual display, perhaps of the page of the document that we have requested to view. Unfortunately this transient display device represents a considerable increase in cost of the terminal over the telephone; probably at least a hundred or a thousand times the cost. However, it is quite conceivable that within the next few years we will have devised a practical and economic method of transmitting information from the information bureau through the telephone system to the subscriber's premises, which he will be able to display on his domestic television screen. Unfortunately this will mean that the person using the system will have to write down from the screen any information that he wishes to retain. The cost of the additional facsimile facility, in order to retain a copy of the requested information, would again be a hundred or maybe five hundred times more expensive than the conventional telephone set.

Of course the foregoing remarks apply to the introduction of information retrieval services on a national scale. There is no doubt that dedicated systems for use within a large organization could be realized a great deal earlier. However, the interchange of information between such dedicated systems requires the development of something approaching the complexity of a public system. Earlier users may notice that transmission costs are more significant than the terminal costs. For these people the trend in the 1970s should result in considerable relief.

Actions by the telecommunication research worker and the information worker

Many of the technological advances I have discussed in this paper will bring about progress towards a more sophisticated information retrieval service, initially for the dedicated network and eventually for the public at large. Increased emphasis needs to be given to reducing the cost of the more sophisticated terminal and of the methods of interconnection between the user and the local exchange. A considerable increase in the capital investment by Administrations will be required to bring about these services. A 1 per cent utilization of the video phone service will require an Administration to double the size of its network. On normal telephony growth at 7–8 per cent per annum an Administration requires to double the size of its network only every ten years.

What can the information worker do to expedite the introduction of the services we have described? Beyond any doubt the major thing is standardization. Standardization of terminals, standardization of procedures, should result in the standardization of the equipment. Only by standardizing the equipment can the terminal manufacturing industry achieve the high volume production associated with low cost terminals. Only by standardization of procedures can the telecommunication system be planned to give you the capacity for signalling your requirements over the network and for transferring the information at the requisite speed and at a viable cost. It is particularly important that pressures for the realization of a private information retrieval network should not suppress the work of standardization.

Future developments in information technology

2. THE IMPLICATIONS OF FUTURE TECHNOLOGY FOR TOMORROW'S INFORMATION WORKER

Robert Jungk

Berlin Centre for Futures Research

Paper presented at the 45th Aslib Annual Conference, Darmstadt, West Germany, 10th–14th October 1971

WHEN THE ORGANIZERS of this conference asked me more than a year ago to provide this meeting with a paper, which should be 'to a high degree imaginative, forward-looking and provocative', I had a feeling, that 'King Aslib' was somehow looking for a court jester, a 'Hofnarr' like the ones which used to enliven the sessions of the Dukes of Hessen at Darmstadt Castle. Now I happen to have a lot of admiration for those sharp tongued little men sitting at the end of the table, because they could dare to utter certain truths—or at least half-truths—and throw out preposterous but sometimes amusing ideas, which the mighty ones could not have uttered without losing face.

I have in fact often wondered why modern science has not made more use of that extremely useful social invention, the holy fool. Would it not provide a lot of challenge and many much needed stimuli if we could have such a lively colourful creature among the ever increasing number of serious journals; one which would be exclusively devoted to the crazy or half-baked ideas (as Goode called them in a remarkable anthology) of researchers, who have to be all too prudent in most of their professional lives? The undeniable historic experience that so many new concepts and inventions looked downright crazy in their earliest phases is known to every scientist. Yet very little has been done to profit from that experience. How many good ideas have been suppressed by their author's critical judgement, by their pride or by their apprehension of looking ridiculous in the eyes and the publications of their peers? I venture to speculate that there must be millions of them killed by intellectual birth control—to the delight, maybe, of swamped information workers. By reserving some time on their schedule for a bit of speculation, by creating a 'free zone' for imagination and provocation, the organizers of the Aslib Conference have shown themselves to be innovators in the all too 'routinized' and rather dull field of professional meetings, and I would like to congratulate them.

But now: Is a court jester expected to dispense praise? No. It is his duty to be critical and even downright vituperative. So let me conform to my role by rasping: 'This conference creates in the mind of many an illusion. It gives the impression that recent progress in the field of information technology and documentation science will help the 'users' to be better informed than ever before. Whereas in fact, while being bombarded with more and more unrelated data, they are less and less informed, worse indeed than their fathers, grandfathers and great grandfathers.

Rather than being concerned with the implications of future technology for tomorrow's information worker, I am really more worried about the information user (and are we not all 'users'?), that poor bewildered devil who, living in an era which is—among other labels—called the 'Age of Information', feels more uninformed than ever about his present, despite the flood of data to which he is exposed. That unfortunate state, which has been one of the main reasons for the alienation and disaffection of modern man, stems from the deepening ruptures between the individual and his world caused by technology and its shattering impact on the relatively small circle in which men used to move. The density, the variety, the directness of informational inputs, which were gained through face to face or first-hand experiences, have not even remotely been matched so far by the multitude of artificial communication links trying to supplant them.

Furthermore, the bulk of our present technology—including of course information technology—is poor in complexity and information when compared with human beings of even modest intelligence. Our machines lack so far the necessary elasticity, adaptability, intelligence and individuality. They tend to turn people, who work with them, into similar creatures with conditioned and impoverished reflexes. They change the environment, which used to be self-reproducing, into dead products plus dead waste.

I do not want to repeat here all the numerous complaints against the 'dead hand of technology'. My aim is rather to show that any exercise in technological forecasting will miss an important point if it neglects the mounting importance of already neglected social and human needs and their growing impact on all future design. While development based on the quantitative extrapolation of material features—for instance, increases in speed and size—may for some time continue, it will probably be more and more overshadowed by machinery geared to the conditions of societal desirability and individual acceptability. The sequence still prevalent today, which makes us first put novelty on the market because it promises to be profitable or 'technically sweet', and then let society worry what to do with it, how to adjust itself to the existence of yet another monster, will almost certainly be changed around. Hasan Ozbekahn, one of the most thoughtful and responsible among the American planning experts, has formulated the first commandment of that new era: 'You should not develop everything you can have, but only what you ought to have.' What then might be the 'oughts' for tomorrow's technology in general and for information technology in particular? I would suggest three main directions:

(1) the development of a more *responsive technology*;
(2) the increased effort to connect or reconnect, that is, to use a systems approach by imbedding technology into larger contexts, that is a *connective technology*;

(3) the greater accent on an *evolutionary technology* based on anticipation ('feedforward') and creativity.

In all these three areas information and communication will certainly move from a more peripheral role into the centre. Information technology is the indispensable gear which will allow man to 'ride things again' (Fromm).

Those who bother to tune in can already receive from these three areas signals of increasing number and strength. *Responsive technology* (also christened 'dialectic technology' by one of its intellectual founding fathers, the Belgian philosopher Henri van Lier) begins to take shape in, for instance, the 'architecture machines' and the 'intelligent environments' of the team around Nicholas Negroponte in Cambridge, Mass. (born it should be mentioned less than thirty years ago!), in Minsky's and Pappert's artificial intelligence group at the Massachusetts Institute of Technology, in the 'event structures' modelled by Sean Wellesley-Miller (Delft), through the 'ecological tools and toys' of Warren Brodey and Avery Johnson devised in their laboratory at Milford (New Hampshire), and finally in the first forays of the 'New Alchemists', a group of biologists working at the famous experimental station of Woods Hole in Massachusetts.

Common to all these prototypes is the emergence of the 'vitalization' of machines, which begin to become perceptive, adaptive and critical. These are no longer the distant, cold and rather narrow-minded objects we have become used to. They have grown into partners, which are being taught and teach back; they even learn to know the individual traits of the personalities they co-operate with. By their superior perception, computation and retention faculties they may get to know their 'user'—as far as his physical condition is concerned—better than he knows himself. This has been used advantageously in the telemetered biomedical monitoring of the astronauts.

Some of the houses Negroponte has built and begun to test can already react to the amount of people who want to use them by contraction or enlargement and they even react to the kind of clothes they wear and the mood they are in by comparing their pre-programmed information based upon the usual behaviour of the 'master'; the evolution of predictive models precedes these actions of the responsive environment, which later on could even come back with suggestions based on superior knowledge or more perfect logic. Negroponte seems somewhat afraid that the 'personality' of his houses might develop to a point where they would invite guests which they prefer to their owners.

These may at first sight seem to be rather playful and not terribly useful exercises. But if we take such experiments seriously and if we see them in a larger context, they foretell an age of increasingly individualized, sensitive, discriminating and sensible machines, which—I was almost tempted to say 'who'—will adjust themselves to man rather than force his adjustment to their monotony, mechanical rhythm and downright stupidity.

But there is another face of the coin to contemplate. The people working with such instruments will no longer be led by them, they will no longer be able to hide behind their mistakes, and they will have to develop a lot more initiative, activity and, as we shall see, inventiveness than before. Let us take the example of the 'information worker'. Many of the tasks he is burdened with today call for abilities which may soon become redundant. The machines he will be working with will be far more precise and more knowledgeable than the frail human beings they interface with. Furthermore they will be patient and self-critical, able to trace their own as well as their users' mistakes. By their ability to get to know the user, that is, to learn from him and to teach him, they will even be able to work with laymen, who—at least in the beginning—'cannot express all their needs and desires explicitly' (I quote from Negroponte's experiences with negro tenants using the terminals of his 'architecture machine'). What will then be left for the 'professional'?

I have often asked myself that question and came up with essentially two functions, which the human users of the responsive machines might perform better than they could:

(1) conceptualization, that is, the design of patterns correlating many separate data in a meaningful way; and
(2) imagination, which implies the possibility to break through known patterns and devise new possibilities.

That raises another question. Could such a 'job profile' be reconciled any longer with the image of the service function ascribed up to now to the information worker? Would he from then on not impinge on the field of other more creative professions?

At that juncture I did not go to the library or any other information system but wrote to my friend Stephan Schwarz in Stockholm, who is an unusually perceptive and imaginative researcher in the field of the information sciences. He answered my question 'Who is the information worker?' with a logical, but rather disconcerting statement:

> The concept will be meaningless in the sense that everybody by then will be an 'information worker' taking part in the information–cognition–decision-making–action–information cycle. . . . This leaves of course space for the professions of information technician (for the development of hardware) and information engineer (for the development of software) such as constructing systems, sifting, condensating and channelling information.

Such a 'job description' does not seem to leave very much to do for the professionals in the field. Instead, other opportunities—you might even call them duties—open up, for the people most closely connected with the field of information and documentation. You may remember that in my enumeration of some likely trends, I stressed the important role of the 'systems approach' in the future development of technology. The task to connect and reconnect the ever growing mass of 'bits' on the one hand and to analyse on the other the astonishing complexity of natural as well as man-made phenomena will engage the efforts of future man-machine information systems. Man will be indispensable in such an endeavour, because his mind can conceive of relationships which transcend the rational—at least what is being considered to be rational in the limits traced by the state of mind in the present—and because he is able to conceive alternative systems based on different attitudes, different surmises, different objectives. To quote again Stephan Schwarz, who drew my attention to these points: 'The important creative role of the information worker might well be to study the extra-rational components, the effects of different goals, their compatibility and their implications.' West Churchman made this quite clear when he developed in his book, *The systems approach*, the scenario of a perfectly responsive information system run by an anonymous 'Centre'. A writer or researcher entering his office in the morning would find on his desk the edited and corrected pages of yesterday's output. The computer would note obvious weaknesses of style, suggest new sentences and evaluate the originality of the writer's ideas after having compared them to numerous other treatments of the subject matter stored in its memory. Such a perfect helper might not only offer its user every day a new pile of relevant papers and books to be studied 'at leisure', but also give an opinion—in polite terms of course—on the quality of the final product.

So far so bad. Churchman, having described such a utopia—or is it a cacotopia?—of a perfect information service, is quick to point out that the system, despite all the data stored in it, might be 'in danger of closure', i.e. 'the inability of the information system and its user to have proper devices with respect to the outside world'. And he points his finger in one particular direction: 'Specifically the user and his information system may very well be cut off from the deeper feelings and realities of people.'

That warning by Churchman was written at a moment when the huge information systems of the US Government, as well as the command control systems of the Department of Defence, set up and programmed by the diligent and intellectually distinguished work of thousands of 'analysts' in the 'think tanks' and other agencies, had proved to be unrealistic and unreliable. Churchman reacts to that state of affairs by proposing a 'dialectical technology' whereby 'the decision-maker is exposed in the limited time available to him to forceful debate about the issues that confront him'.

There are other ways to tackle this important issue. One would be the purposeful creation of many autonomous or largely self-sufficient systems. As long as the going is good they might be linked to other systems, but they would be built in such a way that they could survive without too much difficulty, even after being severed from the larger network, be it by accident or by their own will. In an age of growing complexity and the crises growing out of the difficulty to manage them, it may become necessary to provide quite soon for such contingencies. Warren Brodey has pointed out that living systems can regenerate themselves to a certain degree by their own forces, whereas broken artificial systems built like clockworks become useless unless they are supplemented from outside with spare parts.

This means in more general terms that even in an age of responsive machines and large data rich systems a number of 'information workers' will have to be around either as a critical instance or as the living, self generating and creative parts of systems, indispensable in unforeseen situations.

Let me stay a moment more with this subject. It is conceivable and even probable that powerful ideological forces, be it on the left or on the right, might in the foreseeable future narrowly programme and control information systems such as data nets of nations or blocs of allied nations. What would then be the role of the 'information worker'? He may have to conform, but there is luckily no guarantee that he really will do so and he may then become the receptacle, even the illegal conveyor, of information, which was officially struck from the books or erased from the memories of computerized libraries.

Is this too pessimistic a vision? I am afraid not. Isn't there already now much too much proprietary, secret or forbidden information all over the world held back by governments and industry? And will that trend not be dangerously facilitated by future information technologies? I can very well imagine a group of 'critical information workers', which would set itself up very soon (that is now, before it is too late) in order to fight such tendencies and to stop their growth. But let me, after that short political digression, address myself to the third of the three directions that development should take: the possibility of an evolutionary, anticipatory and creative technology.

Fred Polak has shown the important role which the 'images of the future' play as forerunners of future realities and it will become even more important to design images of desirable futures because an ever increasing part of our technology has not only an impact on its present environment but also on times to come. So far responsibility for shaping the future has not been fully recognized nor really shouldered. The scientific and technological revolution has unleashed forces, whose impact it did not foresee and is now only beginning to anticipate.

Therefore one of the most important duties of man's intelligence, which proved to be so powerful in discovery and invention, will from now on have to be directed towards anticipation. But most of our prognoses so far lack the richness and the complexity of the 'images' created by our imagination. Most of our present forecasts are based on much too narrow extrapolations. A future information technology may open the only method for handling the problem of richer prognoses based on a larger number of parameters than used so far. Added to economic, technological and social anticipations would be human forecasting, and one all important overriding human factor would be intuition based on imagination.

We could then proceed to use such complex anticipatory models as heuristic instruments, adding all kind of random information, of surprise factors, of desired outcomes and see what we might come up with. The experiments of Lawrence J. Fogel with 'evolution by computer simulation' might be used for such invention of 'futures'. We might then even envisage experimental 'cross-breeding' of information deriving from fields of knowledge, which are usually unrelated, as, for instance, law and plant physiology, or neurophysiology and mechanical engineering. What kind of insight could be gained by 'mating' such hitherto unrelated fields? What kind of semantic 'immunity barrier' would have to be surmounted in trying such experiments? And who would then be able to discover new patterns in such a man-made chaos? Who would decipher these self-created enigmas? Probably the breaking of such codes would not succeed if we try to reduce the new composite entities to their original parameters. Different modes of perceptions, different—possibly non-verbal—languages would have to be invented.

Again, the information worker, like a cook who not only knows the ingredients but also the way they combine into new culinary artefacts, might be invaluable in such endeavours.

Once more I feel I may expect too much from the information worker of the future. But if it is true that we progress by devising 'images of the future', then it may be justified to go beyond the probable and aim at the desirable. Such 'feed-forward' presents a challenge which we may call 'crazy' now, but which will sound pretty reasonable by tomorrow.

Now, let me try to outline a number of possible future roles for the information worker. The very first, and the most important function of the future information worker might be his connecting job as a '*generalist*'. Now I remember having talked to Dr Coblans when he was at CERN and he was rather sceptical about the possibility of being a generalist. In fact, how can one be a generalist with this tremendous amount of information being produced? How is it possible to get a picture of the whole when seemingly the whole world is dissected into more and more specialized sections? I feel it still has to be done, only it is not necessary to apply to it the yardstick of precision that you may apply to other parts of science. We may also have to learn in a much more efficient way how to do away with obsolescent information and take on only that which is really new and important. We should really try to develop people who would be, so to speak, '*horizontalists*' as opposed to 'verticalists'. The verticalist would have to go down into one 'mine shaft' of information and get to know everything on one single subject, while the horizontalist, in trying to see the whole picture, would have to lose in depth what he might gain in breadth, even if this whole picture is in many places diffuse and not exact. So, I feel that one of the things the information worker would have to do is put out syntheses of all kinds. He may have to put out different synthetical catalogues which show, say, every three or six months, what is going on in certain sciences—for example, what is going on in physics or what is going on in biology. I feel that the libraries and information centres will have to publish more and more review articles of this kind; but there should also be some people carrying out the nearly impossible task of trying to see how the very different fields impinge on each other and how they appear as a whole. So we would then have two kinds of synthesis, synthesis in one discipline and interdisciplinary synthesis, both carried out by one person. For what we have seen up to now in interdisciplinary work is the extreme difficulty of reconciling different attitudes and different languages. I was one of those who, for a long time, thought it would be possible for people from different disciplines to mix together and learn to talk to each other. My own experiences have taught me that this is much more difficult than I had thought, and only if our education and training are changed will it be possible to have real interdisciplinary work. All our school work, from the earliest age onwards, is geared to specialization and developing one's own 'language'. So at the moment it will remain the task of a very small number of people—i.e. those who are able to look beyond the narrow specializations—to try to provide a picture of the whole.

There is another important role for the information worker to take on and this could be called that of the 'PoP' designer, which means here '*Profile of Public*' designer. That is to say that the different ideas coming from the public at large would have to be profiled, so that the decision-makers could see almost daily, or at least weekly, what the desires of the public are, what the public really thinks. This plan, in fact, implies again that the public would be much better informed than they are today and much better educated. But I feel that if they are asked to supply this information they will begin to learn. Today, many people just do not bother to become informed, do not bother to educate themselves, because they say there is no chance of their influencing governmental decisions, industry, etc., anyway. If they have the incentive of knowing that their 'inputs' might be used, that they might affect decisions, then they would have a real motivation for learning. Unless we create such a motivation, therefore, we will not have the informed public we so often talk about.

Now, another profession I feel would be important would be what I might call—and this is not a very respectful word—the '*sniffer*'. What do I mean by 'a sniffer'? We have this immense amount of work going on in laboratories in the universities throughout the world. Now, I feel that most of our information arrives too late and this happens because we do not receive the information until these laboratories have actually finished their work. Only then is the information taken seriously. I feel therefore that we should actually have observers in the laboratories who take part in the creative process. You might call them 'sniffers' or 'spies'. These are the people who might build up an intelligence network of ongoing developments.

Another rather difficult job I have also mentioned already is that performed by the '*mixer and modeller*'. The mixing of different information might be an extremely important and interesting job in the creation of models, because it might enable us to develop more complex concepts. This may be another job for the creative information worker of the future.

I feel that the most important role for the future information worker is that of the '*gate-opener*', which should not be confused with that of the 'gatekeeper'. He will have access to more and more proprietary information which will not only be wanted by the State, but also by industry. As we develop more and more 'futures research', we will realize that everything nowadays can be part of a concept for the future. The number of cups of coffee we have drunk this morning, for example, may be very important information to some kind of coffee firm, or some kind of restaurateur. He may say that this information is very important to him in that he would like to know the average percentage of people coming to a conference who drink a certain number of cups of coffee, under what circumstances, and so on. Even very trivial facts may constitute important information which interested parties will not want to divulge. This may make life very difficult for people who have to work with information related to the future. I know of one group in an American 'think tank' who, while working for a large electrical firm, heard of a new process to produce energy very cheaply. From that moment on things became very difficult for them, because they were told that they could not use this piece of important proprietary information. From then on every other analysis they worked on was somehow wrong, because they had to exclude knowledge that they actually had; and they had to carry out their work as if this knowledge did not exist. So they began to feel that they were liars, and

I know of one man who dropped out of the whole 'futures' business, because he felt that he could no longer do a responsible job as long as vital information could be denied to the people, especially in a world where so many seemingly small developments may build up into large dangers. It should be more and more important therefore to keep as many information channels as possible open. I feel one of the most important roles of the future information worker will be that of the gate-opener who will work diligently, strongly and even dangerously against this growing tendency to close up information, to own information and not let other people have it. Because that dangerous future ahead of us will not only be influenced by technological, but even more by moral change, which might imply new responsibilities to mankind as a whole, transcending older, more parochial, loyalties.

DISCUSSION

MR J. RIPPON (Metal Box Co.) wondered if there was yet another role for the information specialist. However effective machines might be for storing and correlating information, they could be of little use in overcoming the inertia shown by many potential users of information.

PROFESSOR JUNGK commented that information was often presented in too specialized a language; there was a need to train people in how to communicate to non-specialists.

MR D. BISHOP (Department of the Environment) asked how long it would be before the increased channel capacity mentioned by Mr Edwards would be achieved.

MR EDWARDS replied that there was no simple answer to this. He thought that it would be 1985 before glass-fibre technology came into use, but there would be a data network in operation by 1977/80. The Confravision service was already available.

MR B. T. STERN (Wellcome Research) pointed out that, although the Post Office did publicize new services, their publicity was not always directed towards those information workers who have problems of communication in industry. It is not surprising therefore that there is a lack of volunteers to use Post Office experimental services such as the 'midnight line'.

MR C. D. OVERTON (Department of the Environment) asked about future developments in facsimile transmission. How long would it be before there was a provision for automatic despatch and receipt to make use of preferred transmission times? How would the economics of facsimile versus telex change in the near future?

MR EDWARDS replied that facsimile terminals will move towards a quantised 'dot raster' with electronic as opposed to mechanical scanning. Digital transmission in the network will follow and result initially in a faster service and subsequently in lower costs for the transmission of facsimile messages. By the use of a character translator, telex will become a special case of a facsimile terminal limited to alpha-numerics.

MR G. GLASER (Morganite Research and Development Ltd) said that he was intrigued by Professor Jungk's concept of the 'gate-opener'. It seemed to him that in future, with increasing investment, industry was likely to get more security conscious, not less. In order to perform effectively the information worker had to be wholly trusted by his management; this would occur only if his first loyalty to his organization was beyond question. Would he not then find it difficult to become part of the gate-opening network of the future, without jeopardizing this trust or without creating conflict?

PROFESSOR JUNGK replied that information workers would have to exercise initiative in this area and would need to reconcile what was important for mankind with what was important for their firm or organization. In his view there was a need to adjust the balance in favour of the public interest.

International information networks

1. THE ESRO SYSTEM

N. E. C. Isotta

Head of Documentation and Library Service, ESRO

Paper presented at the 45th Aslib Annual Conference, Darmstadt, West Germany, 10th–14th October 1971

Introduction

First of all, I would like to say how delighted I am that Aslib should have chosen Darmstadt this year as its Conference Centre. There are three reasons for this which are equally important to me. For one thing, it gives me the opportunity to renew acquaintances which were made several years ago when I first had anything to do with any of the Aslib activities. In those days my main interest was with the Electronics Group although, somewhat later, this was also extended to Aslib Council activities. As I have now been with the European Space Research Organization for almost exactly seven years, my opportunities for Aslib contacts have been fairly limited. Secondly, ESRO has its European Space Operations Centre here in Darmstadt and, as you will see from your visit, the ESRO/ELDO Space Documentation Service is based on the computer installation in this Centre. Finally, it gives me the opportunity to demonstrate the NASA/RECON on-line system in operation.

I think I should say here that all the arrangements for both your visit to ESOC and this demonstration have been fraught with difficulties, since the entire computer installation has been shut down for a fortnight in order to enable the core memory to be increased from 768,000 bytes to 1,024,000 bytes. In fact, the PERT schedules for this operation, taking into account satellite launching programmes, ideally shut the computer down this week. However, we managed to shift this by a few days so that, hopefully, everything will work! I feel I should thank, in any case, your Conference organizers for having been so flexible in making the arrangements.

Having set the scene for the always more than possible subsequent demonstration failure, I should perhaps now revert to the paper I am supposed to be giving. In view of the demonstration which we shall be making, I propose to say not too much at this stage about the actual operation. However, an outline is certainly necessary. In the first place, it is necessary to pay tribute to NASA for the generous exchange agreement which has existed since 1964 between NASA and ESRO/ELDO. Under the terms of this agreement, NASA made available its magnetic tape file of document references together with the relevant microfiche collection. In return, ESRO was to process a proportion of the European report literature for subsequent entry into the NASA machine system. The original operation of the Documentation Service was, consequently, based on the IBM 1410 linear files which were provided by NASA and which were searched in Paris on a computer bureau basis. This proved relatively slow and uneconomic and, at one stage, searches were carried out for ESRO/ELDO by the NASA Facility Contractor in Washington, Documentation Incorporated. This situation continued until early 1969 and, frankly, provided an extremely slow service due to the inevitable postal and customs delays. Apart from anything else, the file size was continually increasing at the rate of some 60,000 to 70,000 items per year. Consequently, batch searches were taking up to ten hours of machine time and the results could not, of course, be guaranteed. Search failures, i.e. due to unacceptable recall or precision, had to be resubmitted, but only after the first search results were received in Paris, so that further interminable delays resulted.

Early in 1969, discussions began with NASA concerning the possibility of adopting in Europe the RECON on-line system being developed for NASA by the Lockheed Missile and Space Corporation, Palo Alto, and based on the Lockheed Dialog system. A contract was placed with Lockheed for the installation and maintenance of an equivalent system based on the IBM 360/65 here in Darmstadt. In July 1969, the first terminal was installed on-line in Paris and searches began to be made from the terminal in the interactive mode, for both internal and external users. The first step, therefore, was the offer of normal retrospective searches and SDI up-datings, with profiles in all cases being constructed on the terminal so that, through the dialogue procedure, the search results could be known before any print-out operation was undertaken. Although I do not intend to present any figures I can assure you that the search quality was more than considerably improved by this procedure.

From 1967 to 1969 utilization doubled every year. In 1967 a total of 523 services were provided, 2,676 in 1969, while, last year, 3,086 services were supplied. The corresponding reproduction trade showed similar increases. For example, for 1967, 36,100 microfiche were supplied whilst 95,851 were provided in 1970. The photocopy trade increased from 2,209 in 1967 to 130,879 in 1970. I think that such statistics are exceedingly dull so I do not propose to give you any more.

Existing RECON network

As most of you will know, many mechanization programmes are often initiated simply because it is the 'thing to do'. Such systems are often seen to operate, and even expand, with bare consideration of users' real needs. Usually this happens because machine facilities and time are available and can be pressed into service, whether this is really desirable or not. In our case it was clear that in offering a service to ten member states it was essential to have a system which did not suffer from its own intrinsic inertia which would add to the existing communications delays. Furthermore, any further increase in the machine times necessary for linear file searching could not be contemplated. As a result, the Organization took the very positive step of extensively upgrading the IBM machine here in Darmstadt by, for example, the addition of datacell mass storage capacity of 400 million bytes in order to provide the additional power and flexibility for documentation purposes. The mass storage capacity is, by the way, to be increased to 1,000 million bytes next month. In this connection I think that tribute should be paid to the ESRO/ELDO Documentation Consultative Committee composed of experts from the member states, Euratom and Eurospace, who were sufficiently far-sighted as far back as 1968 to see the real need for such a system and to accept the implications of a decision to go ahead with implementation. The policy which emerges as a result is one of centralized file maintenance and software responsibility, coupled with decentralized searching of the files by external terminals sited in the member states.

The present network consists of, first of all, the focal 360 in Darmstadt, together with its own local terminal; a single leased line to Paris where two terminals are installed; a party-line connection from Paris to St Mary Cray in Kent where a terminal is installed at the Technology Reports Centre; a party-line connection from Paris to Bretigny, where a terminal is installed at the Centre Nationale D'Etudes Spatiale; a terminal in the ESRO establishment in Noordwijk, Holland; and another ESRO terminal in the ESRO establishment in Frascati near Rome.

Immediate plans for expansion include: the provision of a dial-up capability, in the first place, for a dial-up terminal in Stockholm at the Royal Institute of Technology; a terminal installation for the Zentralstelle für Luftfahrt Dokumentationen in Munich; an installation for the Centro Nazionale de Ricerca in Rome and, possibly, additional ones in Turin, Geneva, etc.

From the external users point of view (and here I am rather at variance with Mr Edwards) the most expensive item in the system is probably the four-wire leased line which is necessary for the connection to the computer. Obviously, the distance to the nearest connection point for entry to the network needs to be kept as short as possible. This implies a true party-line operation, i.e. a number of terminals all connected to the same main line at the same time. This is, in fact, the configuration which we currently have for the Paris connection or switching point (see Fig. 1). The system operates in a half duplex mode, i.e., although the computer is on-line all the time to the terminals by means of a permanent carrier which is transmitted from Darmstadt outwards, terminals are only authorized to reply after they have been authorized to do so through the polling sequences generated by the computer programme. Each terminal is thus separately addressable by the computer and only responds when 'polled'. It replies in two ways: either with a message which it wants to transmit or with a 'negative acknowledgement'. Such a party-line system very quickly achieves economies of scale, since the cost of telephone lines can be amortized over a number of terminals. In this respect I agree with Mr Stern—there is a lack of information from the GPO and national PTT's.

The main problems in establishing the overall network have been, from the beginning, associated with the half-duplex party-line systems, and the alternative dial-up capability. We have found, for example, that in the Paris switching centre we have had, one after the other, two different prototype equipments, neither of which really performed up to expectation. This seems to be an astonishing state of affairs but it is partly caused by the apparent lack of uniformity

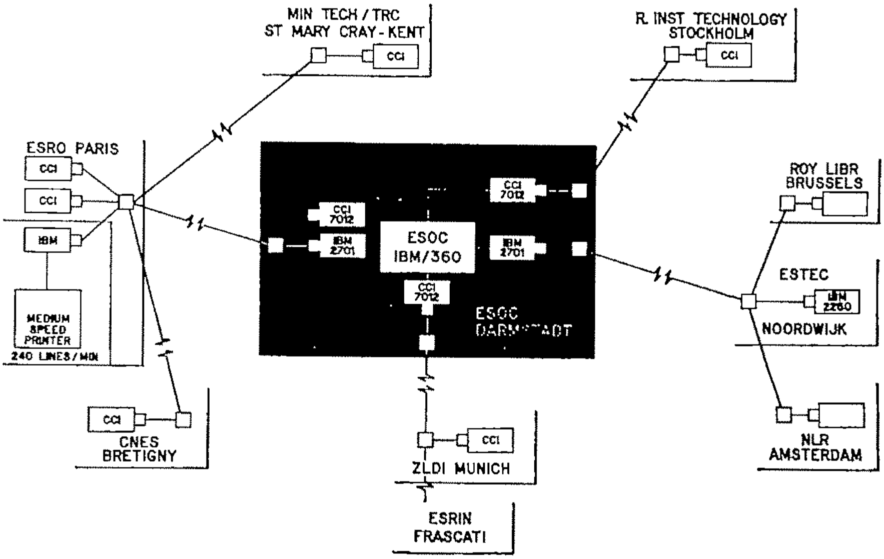


FIG. 1: *The first European network for the dissemination of scientific and technical information*

in the requirements of the various European PTT's. There is not even, it seems, a standard colour coding for the four wires which appear at each end of the line and it becomes the users' responsibility to identify correctly the emission pair and the receive pair.

Hardware

The main requirement, from a user's point of view, is a control unit with buffer and a television screen with a keyboard (see Fig. 2). An additional and useful piece of equipment is a teletypewriter attachment for recording the dialogue between the analyst and the machine. This attachment can range in speed from ten to about forty characters per second. Normally, it is not recommended that complete references should be printed on this attachment since, due to its low operating speed, it ties up the terminal equipment and the line for unacceptably long periods. However, there is no reason why it should not be used to print out, for example, lists of accession numbers.

Once a search has been completed, print-out action can be commanded from the keyboard and this command and the list of references is stored in Darmstadt until the end of the RECON session, at which time high speed print-out takes place for each of the terminals operated on the network. Print-outs are segregated by terminal so that the work of each terminal can easily be identified and despatched. We are studying the possibility of sending print-outs direct to external terminal users over the existing telephone line connections outside normal RECON operating hours. This will be achieved by transmitting to either a remote IBM 1130 computer or a smaller IBM 2780 printing terminal. This means that print-out can be sent out over the line virtually the same day

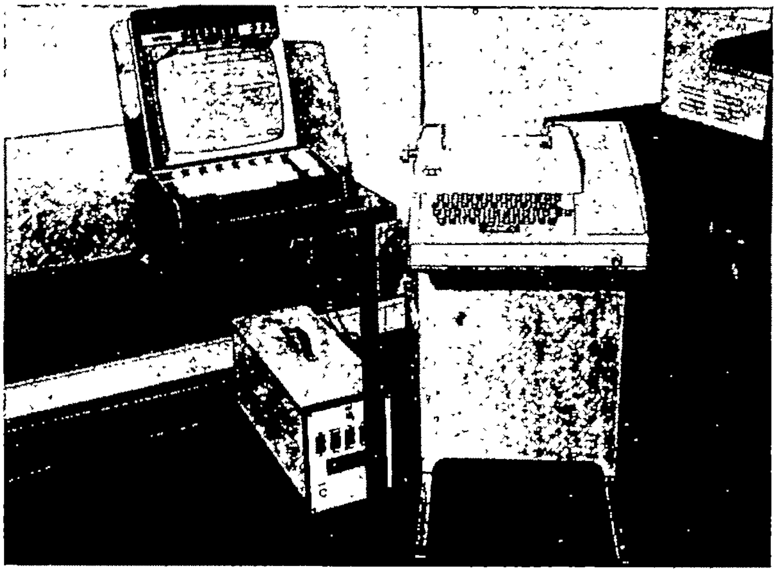


FIG. 2: *RECON terminal equipment*

and this is, in fact, already happening between Darmstadt and Paris where an 1130 is installed.

Obviously the load on the computer increases as terminals are added and it is to be expected that response times become longer. So far, this has not proved to be a problem but we are, this week, about to install a new terminal Input/Output package which will already speed up the response before the problem really arises. We would expect the situation to remain reasonably acceptable up to about thirty terminals. However, around that point it is probable that a small front-end communications computer should be added to the main computer in order to reduce the terminal handling load on the main program. This is already being studied so that if we achieve thirty terminals we shall be ready with another improvement in system capability. We believe that response time, after a terminal user has entered a command, should not be greater than five seconds.

The main special requirement at the 360 in ESOC is, of course, sufficient mass storage to hold the files. Close on a million document references are now stored in 1.5 datacells, i.e. a total of 600 million characters. Next month an additional datacell will be installed so that the total capacity available for documentation purposes will be approximately 1,000 million characters. Obviously, additional channel control devices are also necessary, together with back-up stores on disks. The total core requirements for this rather powerful retrieval system are 140 K bytes.

Software and files

As stated earlier, the software is designed by the Lockheed Missile and Space

Corporation. However, a number of improvements and modifications have been specified by ESRO in a continuing improvement programme. The necessity to speed up system response as new terminals are added has already been mentioned. As we think that further economies of scale and greater efficiency can be obtained, not only by adding terminals, but also by adding more data bases, we are now running some five files which accounts for our large mass storage requirements. We feel that, in general, we should not offer SDI type services on the majority of these files as many organizations with specialized interests are able to run their own SDI routines against commercial tapes, with only modest computer requirements. It seems to be reasonable that as ESRO is in a position to make centralized mass storage available, the Space Documentation Service should concentrate on the provision of retrospective on-line searches of these multiple files.

When an analyst begins a search he will normally, having examined the question, select one of the files. A new facility that we now have is that we may, during the search, switch files. What we would like, however, is to enable the analyst to decide in advance which combination of files he wished to search so that some merging of dictionaries might be possible. We are also investigating the possibility of searching on free-text words although we feel that this should probably only be done on sub-sets of the main files.[1] We have, in addition, a capability to search the atomic energy files and now also have our own data base constructed from the ESRO Databank on electronic components. This last file may also be interrogated on the RECON system. We have not so far had any great difficulty in converting any existing file for use on the RECON system.

Conclusion

Looking to the future I think it is worth quoting a statement which has, I know, been quoted elsewhere several times: 'Obsolescence of book libraries, as we know them today, for general factual information is expected between 1985 and 1998 with 1992 as the most probable year. Computers are foreseen to be used for both storing abstracts and for retrieval of documents.'

I must confess that I do not really agree with this prediction since I do not think that such a thing could happen to 'book libraries', even if they are for general factual information. Where would we be, for example, without the *Encyclopedia Britannica*! I saw in the *Sunday Telegraph* recently that the *Oxford English Dictionary* of thirteen volumes is now available in a compact edition of two volumes (photographically reduced) plus a folding magnifier—cost £28 instead of £90. It is, of course, absolutely certain that in the fields of report literature, general information and databanks of various types, computer on-line systems will be the rule rather than the exception by 1990. The most important step in this direction is the rapid expansion of mass memory capabilities. In addition, new systems of storage and read-out are continually emerging with faster and faster access times. Some of the latest scientific developments are being put to use in this way: lasers, video tape systems and holography. However, the datacell is not to be despised since a total datacell system capacity is over 3,000 million bytes. A video tape system has a capacity of 4,000 million bytes but its access time is approximately fifteen seconds (at the moment) compared with the 0.4 seconds for the datacell and 0.04 seconds for disk. Obviously, the storage cost per bit stored is loaded in favour of the higher capacity systems.

The principle of networking, associated with centralized file storage and maintenance and software development, together with decentralized searching, seems to be on the right lines. In the first place most people are, at last, becoming accustomed to using other people's tapes rather than always constructing their own. Some of us are even prepared to use other people's software and, through a process of gradual progression, maybe many of us will eventually use other people's networks. Obviously, individual economics cannot be calculated since circumstances and requirements vary enormously from organization to organization. However, there is no doubt that the economies of scale mentioned earlier, together with the continual decreasing price of mass storage and terminals, will lead to significant changes in comparative costings between local retrieval services and remote on-line operation. I do not include here the question of SDI, although if terminals were sufficiently cheap and line costs were also reduced, there is no reason at all why a terminal owner should not permit users to call up the new references entered in the system since the last time he sat at the terminal. Unesco has just produced its report on the feasibility of a World Science Information System and our distinguished Chairman, Dr Coblans, was a member of, according to my accounting, two of the main working groups which prepared the basic material for the UNISIST Report.[2] Consequently, I would hesitate to comment too much on the results of the study but I cannot resist the following quotation from the chapter in the synopsis labelled 'The trend towards co-operation':

> However, from the point of view of systems economics, where the workload requirements do not approach the system's capabilities, it is considered more desirable to have shared-time arrangements on a central computer than to decentralize the processing.
>
> It is at the output level where these large systems demonstrate economic incentives for increased co-operation. These systems, whatever the field of science, have a common characteristic. Once the capital costs of developing the system, and of building and maintaining its data base, have been met, the incremental costs of providing additional services over the basic one for which the system was intended are relatively modest. The systems have an incentive, therefore, to exploit their data bases in order to provide additional services and products, thereby reducing their unit costs of processing.

REFERENCES

1 See also HERSEY, D. F. *et al.* Free text word retrieval and scientist indexing, performance profiles and costs. *Journal of Documentation,* 27, 3, September 1971, p. 167–83.
2 UNISIST: Study report on the feasibility of a world science information system, by Unesco and the International Council of Scientific Unions. Paris: Unesco, 1971.

International information networks

2. THE INTERNATIONAL NUCLEAR INFORMATION SYSTEM

C. W. Pelzer

Director, Division of Scientific and Technical Information, International Atomic Energy Agency

Paper presented at the 45th Aslib Annual Conference, Darmstadt, West Germany, 10th–14th October 1971

1. Introduction

As the peaceful uses of atomic energy became an accepted part of modern life, the veils of secrecy were removed from most aspects of nuclear research. Cautiously at first, the developed countries began to exchange nuclear information at scientific meetings and through journals and other media. However, with the widening range of peaceful nuclear applications came a corresponding increase in information, and the complexity of information storage and retrieval was suddenly a concern of paramount importance. National nuclear information centres were set up to satisfy the needs of scientists in their home countries, but a gap still existed in the exchange of information on the international level.

One of the prime functions of the International Atomic Energy Agency, as defined in its Statute, is 'to foster the exchange of scientific and technical information on the peaceful uses of atomic energy'. The Agency's Division of Scientific and Technical Information is devoted entirely to this end and accomplishes its task in a variety of ways, but the one which I am here to speak about today is the International Nuclear Information System—better known by its acronym—INIS.

2. Conception and development of INIS

As early as 1964, the IAEA had become concerned that it was not adequately meeting its statutory obligations to foster the exchange of nuclear information amongst its members.

In taking steps to remedy this situation, the Director General invited one consultant from the USSR and one from the USA to outline an information handling scheme that would provide comprehensive coverage of the literature; incorporate up-to-date co-operative procedures for obtaining data; and provide the latest techniques for storage and retrieval. Thus began a four-year study for the determination of operating policy and systems development involving about fifty information specialists, many of whom were internationally recognized.

From this extensive study the following were set forth:

(1) English would be the carrier language of the system.
(2) National and regional information services would work together in a network for the preparation of data to go into the system and for the dissemination of its products.
(3) Input of data would be decentralized.
(4) Bibliographic descriptions stored on computer tape would be provided with keywords for eventual retrieval purposes.
(5) There would be a microfiche service for non-conventional literature and for abstracts (required with each piece of literature submitted).
(6) The Agency would have a centrally maintained thesaurus for effective subject control of documents input to the system.
(7) Since Euratom was operating a well-functioning system, an INIS Thesaurus and indexing instruction manual should be developed by them under contract. (The negotiated contract also included a set of computer programmes for processing the index terms as well as error detection and error correction routines.)

In 1969 the proposal to create INIS was approved by the Board of Governors and then by the General Conference of the IAEA. The decision was made to put the system on an operational basis as early as possible in 1970 with a limited subject scope to be expanded step by step. The initial subject scope of the system was limited to the following:

Reactors and reactor materials
Uranium production and fuel cycles
Nuclear techniques in food and agriculture
Health, safety and waste management
Isotope production
Industrial applications of radiation
Peaceful nuclear explosions
Safeguards, legal and economic questions

It was expected that the foregoing scope would limit the yearly output of items reported to about 25 per cent of the world's estimated volume, or about 21,000 items. Last July a panel of experts representing fifteen Member States and six International Organizations participating in INIS recommended, following a review of fourteen months' operation, that the scope be increased, beginning on 1st January 1972, to include:

Medicine
Biomedical applications
Complete chemistry coverage from which analytical, inorganic, organic, physical, nuclear, and radiochemistry had been excluded; and
Complete instrumentation coverage, from which particle and radiation detectors, radiation detection, and measuring instruments had been excluded.

The latter two categories will for the first time bring into the system items of significant interest to physicists.

This expansion of the scope will increase the yearly coverage to about 50 per cent of the world's nuclear literature, or 43,000 items. Also, the panel recommended that by 1st January 1973, the system should go to full scope. This would add full coverage of general and high-energy physics, accelerators and biology, and should bring the published items to a total of about 85,000 per year.

3. The start-up

(1) *Staffing*

While many of the design aspects of the system were being worked on by the few members of the Agency's existing documentation service and the consultants provided by the Member States, a vigorous recruitment programme was being carried out in 1968–9 by the IAEA. There was particular interest in securing individuals with descriptive cataloguing, indexing, and thesaurus maintenance and development experience, with backgrounds covering a broad spectrum of disciplines and, at the same time, individuals who had themselves been practising engineers and scientists, and thus both users and generators of the kind of information involved in the system. The Agency has been fortunate in finding professional people of this kind and they provide the assurance of a very important element always being foremost in administration of the system—namely, the user's point of view is primary in any consideration of changes in the system or even in the format of the output products.

The present organization of the INIS Section at the Agency is shown in the chart in Figure 1. The number of positions indicated is considered to be adequate even for full operation, since many of those presently involved in developmental and system-refinement studies will devote more time to the routine activities of cataloguing and indexing of IAEA input and checking of members' input after the developmental activities have diminished. However, at present we have found it necessary to add some temporary part-time help to assist in indexing and input checking duties.

In addition to the INIS Section staff there is, of course, support from the Computer Section where the equivalent of about three man-years of systems analysis and programming have been devoted to preparatory and operating activities. There should be a decrease in this requirement in the next few years as we complete the development and testing of Selective Dissemination of Information (SDI) and retrospective search programmes.

(2) *INIS Reference Series*

The general operating rules for INIS are contained in manuals referred to as the INIS Reference Series. Although a considerable effort was expended by consultants and various specialists made available to the Agency by Member States in outlining these rules, an immense amount of work remained to be performed by the Agency staff itself or through contractual arrangements. This consisted of the preparation of the detailed operating procedures, and putting the subject indexing, abstracting, and descriptive cataloguing rules in a clear and concise manual form. The current series consists of the fourteen documents listed in Table 1.

TABLE 1: *Reports in the INIS Reference Series*

IAEA-INIS-1 (Rev. 1)	*Descriptive cataloguing rules*
IAEA-INIS-2 (Rev. 1)	*Descriptive cataloguing samples*
IAEA-INIS-3 (Rev. 1)	*Subject categories and scope descriptions*
IAEA-INIS-4 (Rev. 1)	*Instructions for submitting abstracts*
IAEA-INIS-5 (Rev. 2)	*Terminology and codes for countries and international organizations*
IAEA-INIS-6 (Rev. 3)	*Authority list for corporate entries*
IAEA-INIS-7 (Rev. 1)	*Magnetic and punched paper tape codes and character sets*
IAEA-INIS-8 (Rev. 1)	*Paper tape specifications and record format*
IAEA-INIS-9 (Rev. 1)	*Magnetic tape specifications and record format*
IAEA-INIS-10 (Rev. 1)	*Transliteration rules for selected non-Roman characters*
IAEA-INIS-11 (Rev. 0)	*Authority list for journal titles*
IAEA-INIS-12 (Rev. 0)	*Manual for indexing*
IAEA-INIS-13 (Rev. 0)	*Thesaurus*
IAEA-INIS-13A (Rev. 0)	*Terminology charts*

(3) *Equipment*

The equipment requirements for INIS were studied from two aspects: the processing of input of items from Members and the preparation of products for the users. To appreciate the requirements, one must understand that input is received in three distinct forms—worksheets, paper tape, and magnetic tape. The worksheet is the most fundamental or basic form, and is the form in which input is received from most members, particularly developing countries. To transfer the information provided on worksheets to paper tape we use a Flexowriter, model 2303, costing about $5,000. Currently only one is required and it is not planned to purchase another in the immediate future, but to go to a two-shift operation.

For converting paper tape to magnetic tape, a Mohawk converter is used, at a rental of $334 per month, including service. This converter is shared with other programmes at the Agency, and INIS's share is at present thirty hours per month.

The magnetic tapes, consisting of the Agency's and three currently supplied by Member States, are merged on our IBM 360/30 for which INIS is currently using about 15 per cent of the time. The increase anticipated by INIS and other users (we also service UNIDO in addition to other IAEA programmes) has resulted in notifying IBM of our interest in renting a 370/145 computer beginning in July 1972. The current (360/30) and future (370/145) configurations are shown in Tables 2 and 3.

In the Clearinghouse, which microfiches abstracts of all items as well as all non-conventional documents received, and which fills standing and individual orders, the equipment presently in use is as follows:

1. Bell and Howell step and repeat automatic camera.
2. Cordell Varifilm Processor, Model 642—for development of microfiche film.
3. Technifax, Model 601—Diazo duplicator.

A replacement for the latter is necessary for reasons I will touch on later.

FIG. 1: *INIS SECTION—August 1971 staff totals: 14 professionals 17 clerical*

INIS SECTION
Head
1 Clerical

Functions:
1. administer overall activities of the Section
2. plan future evolution of INIS

SYSTEMS ANALYSIS UNIT

Supervisor
1 professional
1½ clerical

Functions:
1. develop technical framework for INIS implementation
2. examine and analyse existing systems to attain INIS objectives as efficiently as possible and plan future evolution of INIS
3. establish system specifications and standards, including quantity and quality controls
4. receive input and schedule flow through appropriate INIS units
5. identify obstacles to input flow, recommend remedial action, and analyse and evaluate computer reports of statistics
6. maintain liaison with input centres and coordinate communication with liaison officers
7. assist in preparations for formal meetings involving INIS activities and external participants

BIBLIOGRAPHIC CONTROL UNIT

Supervisor/clerical
3 clerical

Functions:
1. spot check and proofread descriptive cataloguing input
2. keyboard all input received on worksheets, including corrections
3. proofread printouts of *INIS Atomindex* entries
4. schedule edited products for computer processing
5. prepare and maintain authority list for corporate entries, journal titles and report number prefixes
6. assist in development of descriptive cataloguing tools
7. assist descriptive cataloguers of Member States in interpretation of INIS rules and in training cataloguers

SUBJECT CONTROL UNIT

Subject category branch
Supervisor
6 professional
5 clerical

Functions:
1. subject index, subject classify, and descriptively catalogue IAEA and other international organization input to INIS
2. write and/or edit abstracts for the above input
3. conduct sample checks and evaluate subject indexing and classification submitted by Member States
4. proofread, edit and correct descriptors and classification on error lists
5. assist in evaluating proposals for new descriptors and in development of the INIS Thesaurus
6. assist in developing INIS subject classification and defining subject scope
7. assist in research and development of new subject indexing techniques
8. prepare training programmes in subject indexing and assist Member States in interpretation of INIS subject indexing rules
9. participate in subject retrieval studies and development work leading to SDI and retrospective searching
10. compile and publish the *Reactor Directory* and perform other editorial and bibliographical tasks as assigned by the Section Head

SUBJECT CONTROL UNIT
Thesaurus maintenance branch

Supervisor
½ clerical

Functions:

1. develop and maintain INIS Thesaurus
2. evaluate proposals for new descriptors and proposed terminological and hierarchical changes
3. correct and update the INIS Thesaurus
4. assist in research and development of new subject indexing techniques
5. participate in subject retrieval studies and in development work leading to SDI and retrospective searching

CLEARINGHOUSE

Supervisor
5 clerical

Functions:

1. sort and assemble INIS abstracts and non-conventional literature
2. prepare microfiche masters and copies of INIS abstracts, INIS non-conventional literature and of UNIDO-supplied documents; prepare microfiches of selected journals for IAEA library
3. maintain files of microfiche masters and of records pertaining to subscriptions
4. fulfil and mail orders for microfiche

EDITORIAL and COMPUTER PROGRAM LIBRARY ACTIVITIES*
Editorial
1 professional
1 clerical

Functions:

1. edit the journals *Nuclear Fusion* and *Atomic Energy Review*

Computer Program Library
1 professional

Functions

1. maintain Computer Program Library for IAEA at Ispra

*Not part of normal INIS activities but assigned to the Section for administrative convenience

TABLE 2: *Computer configuration, IBM 360/30—IAEA, Vienna, August 1971*

CPU	65.536 bytes of memory Universal instruction set 1052 console
4	2401/2 magnetic-tape units, 9-track read-write head, 800 binary digits per inch, 60,000 bytes per second
1	2401/1 magnetic-tape unit, 7-track read-write head, 200/556/800 binary digits per inch, 7,500/20,850/30,000 bytes per second
3	2314 disk units
1	2501 card reader
1	2520 card reader/punch
1	1403/N1 printer. Universal character set. 1,100 lines per minute

TABLE 3: *Proposed computer configuration, IBM* 370/145—*IAEA, Vienna, July* 1972

CPU	212,992 bytes of memory Universal instruction set 3215 Printer keyboard
4	3420 magnetic-tape units, 9-track read-write head, 800/1,600 binary digits per inch 60,000/120,000 bytes per second
1	2415 magnetic-tape unit, 7-track read-write head, 200/556/800 binary digits per inch, 3,750/10,425/15,000 bytes per second; 9-track drive 800 binary digits per inch, 15,000 bytes per second
6	2314 disk drives (two 2319 units)
1	3505 card reader
1	3525 card reader/punch
1	1403/N1 printer. Universal character set. 1,100 lines per minute

4. The INIS products

Let's take a look now at the products of INIS:

First, there are the ***computer magnetic tapes*** which contain detailed bibliographic records and subject descriptors for all items of literature reported by INIS. They permit the selection of items by any of a large number of different parameters (subjects, titles, authors, institutions, countries of origin, dates of publication, forms of publication, etc.), the printing of lists in preferred sequences, and the generation of indexes. The carrier language of the computer records is English, although titles are also given in the original language (transliterated from non-Roman alphabets when necessary).

A new supplement to the magnetic-tape file is produced each month and copies are available to any International Organization or to the government of any Member State participating in INIS. The records in each tape are recorded serially, and both 7-track and 9-track formats are available.

The second product is an indexed announcement bulletin known as *INIS*

Atomindex. This publication is issued once each month and provides an ordered record of all items that have been identified in the magnetic-tape service. It is now printed from the magnetic tape from the IAEA's computer in Vienna by phototypesetting in Frankfurt. One free subscription is given to the depository nominated by the government of any Member State of the IAEA, and additional copies are sent to the centres that provide input to INIS. *INIS Atomindex* is also available for sale to any person or institution anywhere in the world. As with all its publications, the IAEA accepts payment in the currency of any of the many countries in which it maintains bank accounts. Entries in *INIS Atomindex* are grouped according to a relatively broad subject category scheme; computer-printed indexes are included in every issue and permit searching for authors, for institutions and for report numbers. Cumulative indexes are prepared twice each year.

The third product is *abstracts on microfiches*. Every item in the magnetic-tape record and in *INIS Atomindex* is identified by a serial number. For every item, an abstract is available in at least one of the official languages of the IAEA (English, French, Russian, or Spanish). These abstracts are sequenced according to the serial numbers and microfiches are prepared at a reduction factor of about 18 : 1. Up to sixty frames are reproduced on a single sheet of film (148 mm × 105 mm), and provided with a title that can be read by the naked eye.

The INIS abstracts-on-microfiche are available, like *INIS Atomindex*, on annual subscription to any person or institution anywhere in the world.

The fourth product is *full texts of non-conventional literature on microfiches*. Many of the items recorded by INIS are articles in scientific and engineering journals or commercially published books. However, many of the other items—which we identify as 'non-conventional' literature—are not readily available through commercial channels, e.g. laboratory technical reports, pre-conference papers, and theses. These non-conventional items currently comprise 30 per cent of the items reported in *INIS Atomindex*.

The IAEA acquires copies of the full texts of all 'non-conventional' literature reported by INIS and converts these to microfiches. The microfiches may be ordered, either individually or in sets, from the IAEA.

In a simplified form, the INIS Flow Chart (see Figure 2) shows how the input is processed in order to provide the output products just described.

5. System costs

INIS being a shared system in which the participating Member States and International Organizations cover the literature published in their area, the extent of effort is proportional to the programme size and, therefore, within the limits of the participants' financial capability. There is one possible exception to this, and that is in the Netherlands where, as you know, an unusually large number of international journals are published. Our Dutch colleagues, however, are very accommodating and are gearing up to cover this added burden for which we are most grateful.

The Agency's costs for INIS in 1972, including computer costs and some equipment replacements, should be about $550,000. When INIS is operating

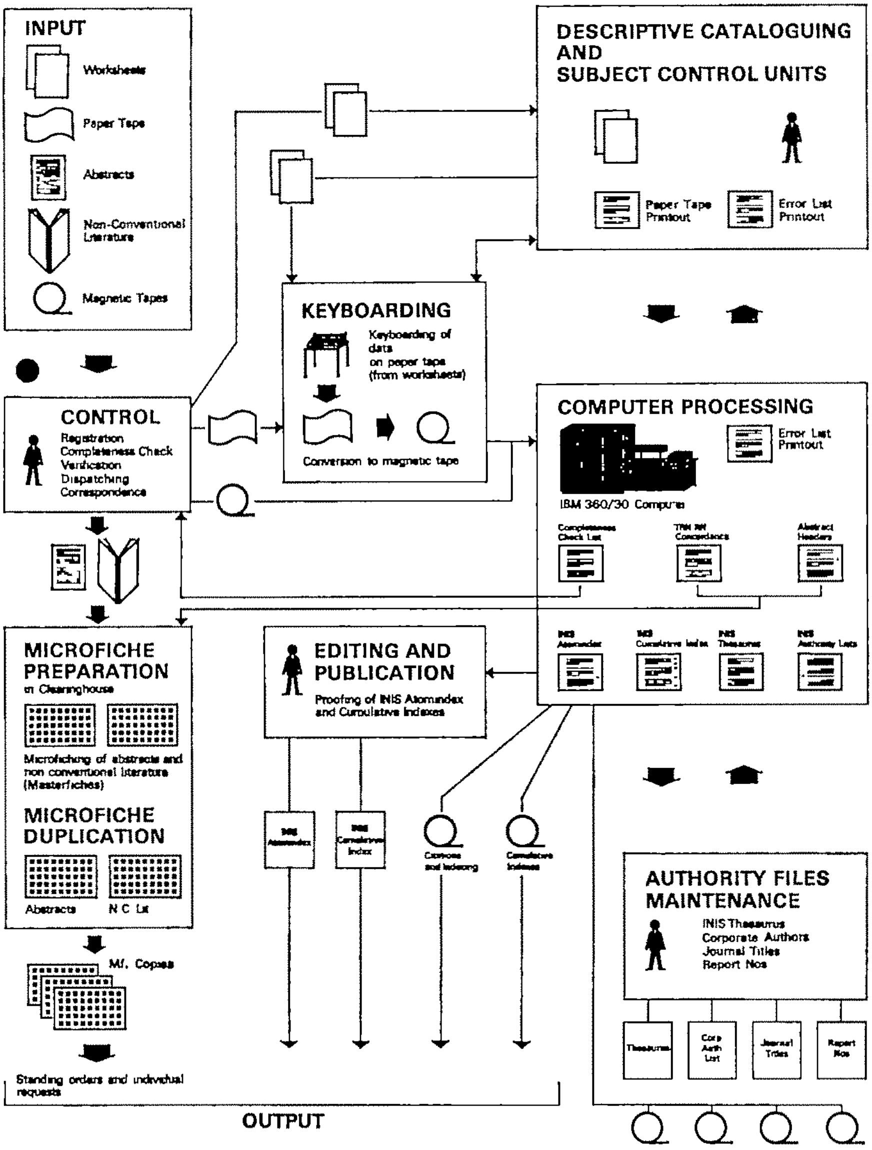


FIG. 2: *INIS flow chart*

at full scope—which, as previously mentioned, we expect will begin in January 1973—the input is anticipated to be 85,000 items per year. Assuming no strong inflationary effects, the Agency's INIS costs are not expected to change in 1973 or in the immediate future from those in 1972. Precise Member States' and International Organizations' participation costs are not known at this time.

6. INIS operating policy

The IAEA has primary responsibility for the operation of INIS, and for the continuous review of the methods and procedures incorporated in the system. However, INIS is a service to Member States in which they have invested through their funding of the Agency's budget and through their investment in personnel and equipment resources at the national level. Therefore, the Agency follows a policy of consulting with participants in a variety of ways before major changes are instituted. This is essential to assure that no important points are overlooked or, more particularly, that revisions or new requirements that might be imposed do not cause any unusual hardship.

In implementing this policy, several means are employed. First of all, contact is maintained with the established Liaison Officers of INIS members (designation of Liaison Officers is a requirement for participants in the system) through the medium of INIS Circular Letters. These letters primarily cover announcements that include such items as descriptions of changes and their effective dates. The process leading to an announced change may take several paths, depending upon its depth, extent, or financial implication. In most instances involving relatively minor changes, the proposals are first circulated to Liaison Officers by means of INIS Technical Notes. The responses are thoroughly evaluated and the appropriate decision made. To consider complex problems, special study or working groups of experts are formed. In the instance of major changes, such as those involving scope or larger computers, a final review is made by the Agency's Board of Governors and its responsible committees.

While from the foregoing it might appear that the Agency is concerned only with changes and their effect on the internal workings of INIS, this is not the case. Staff members continually serve on working groups developing systems such as UNISIST (a world science information system) and AGRIS (agricultural information system) to help assure future compatibility, and some serve on committees of the International Standards Organization (ISO).

At all stages of review, the ultimate purpose is to maintain the integrity and efficiency of a system whose development represents not only a significant monetary investment, but also the collective intellectual effort of internationally recognized experts in information services.

7. Error detection

A natural function of management in a decentralized information system is to have a systematic error-detection programme. This is particularly vital in the early stages of a new system, and INIS is no exception. In the first ten months of INIS operation, indexing terms were not provided by Member States since the Thesaurus was not available from the contractor until later than anticipated. However, during this period considerable effort was put into analysing errors in descriptive cataloguing.

The most common errors occurred in the following areas:

1. Header information	–bibliographic levels did not always correspond with the main body of information.

2. Corporate entries –invalid names or incorrect code numbers were being used.
3. Journal titles –invalid titles were being used.
4. Tag no. information –in some cases tag numbers were missing or contained invalid information.

In the first thirteen months of operation, the average was one cataloguing error for every line item of bibliographical input. A recent check has indicated a reduction to one error in every three items of input, and many of these are readily correctable by us without requiring an inquiry to the sender.

While the rate of improvement is certainly encouraging, and reflects the practical experience gained by the participants, continued emphasis on improvement is obviously still necessary.

Starting on 1st March 1971, subject indexing was required with INIS input. On an input processing run the following major lists are produced by computer for subject control purposes:

(a) a proofing list, giving the complete description of a piece of literature with the descriptors as submitted to INIS;
(b) an Index Term Error List;
(c) a Proposed Terms List.

In addition, at the end of each monthly cycle, cumulative lists are prepared showing all errors in the index terms not yet corrected, including all the proposed terms suggested during that monthly cycle. The corrections for misspelled or mispunched index terms are done on the computer printout itself. Thus time is saved and corrected terms need not be re-written on a special correction form sheet which could be an additional source of error. To date, few difficulties have been encountered. The number of corrections of index terms as well as the number of decisions to be taken on proposed new terms were not too numerous and could be handled within a monthly cycle.

During the correction procedures many documents with low indexing quality were found. Two kinds of mistakes in the descriptors assigned were most common:

(a) general descriptors were used where specific indexing would have been possible, or

(b) too few specific descriptors were used where more would have been necessary to describe the information content of a piece of literature.

A rough check revealed a low quality even with contributors who claim long experience in subject indexing. As the responsibility for the selection, description, and quality of the input lies with the inputting country or organization, IAEA did not delete or add any new descriptors to the original set assigned by the inputter. However, IAEA being responsible for subject control, we began immediately to undertake a 10 per cent sampling of the total input. This has subsequently been increased to 20 per cent. Since September 1971 the contributors are being regularly informed about the results of these evaluations in order to take the necessary steps to improve the quality of their indexing.

Also, the quality check allows us to find ambiguities in scope descriptions,

descriptions of information of major importance not included in the initial as well as in the final subject scope, or to determine where a redistribution and refinement of subject categories is necessary.

8. Computer operations

The configurations of the current and future computer facilities were previously described and provide a system as outlined in Figure 3.

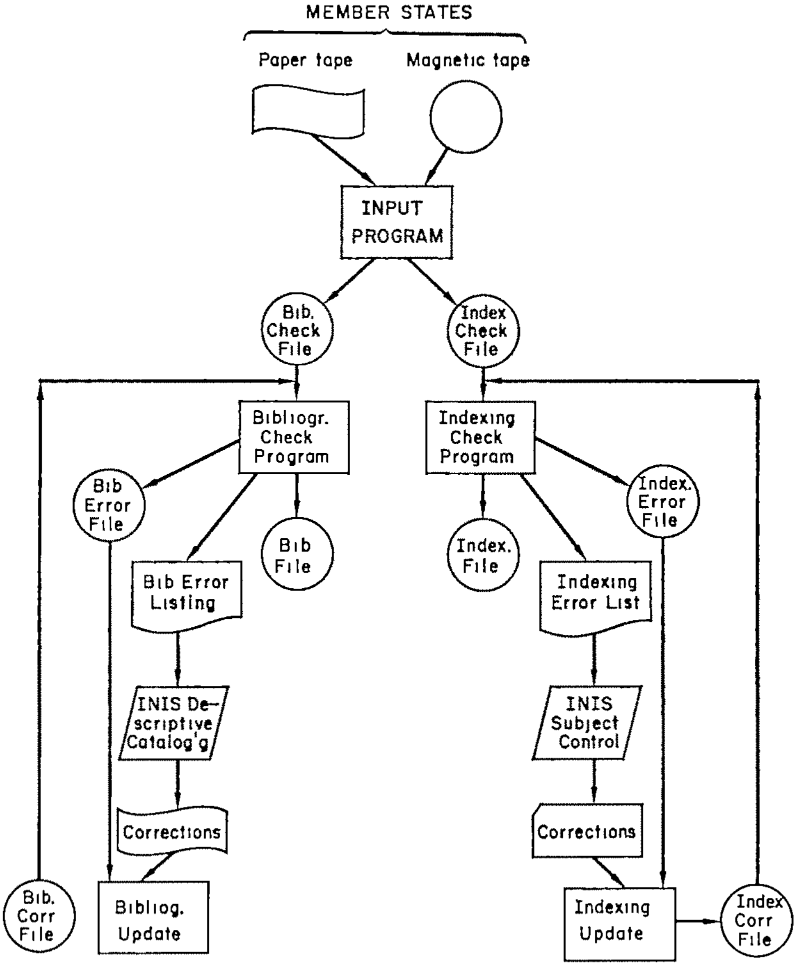


FIG. 3: *INIS computer system—checking*

The machine-readable data (recorded on paper tape or magnetic tape), consisting of both the bibliographic description of the pieces of literature and their subject contents description, in the form of descriptors from the INIS Thesaurus, are first converted into an internal working format. The data are processed in batches, each batch normally consisting of the input of one Member State. Each record is separated into its two constituents (i.e. bibliographic and subject descriptions) and these are then routed to the corresponding checking programmes.

At the end of the processing of the batch a reference list is produced, displaying each record processed and, where applicable, a detailed summary of the corresponding computer-detected errors.

During the processing the computer system maintains automatically four major files:

(1) Bibliographic file: containing formally correct records (i.e. records in which *the computer* did not detect any bibliographic errors);
(2) Bibliographic error file: containing records in which the computer detected at least one bibliographical error;
(3) Indexing file: containing all descriptors which are in accordance with the INIS Thesaurus; and
(4) Indexing error file: containing all descriptors which are not in accordance with the INIS Thesaurus (e.g. forbidden terms).

All these files are cumulative, i.e. they always reflect the latest status of the material received by INIS up to a certain date.

The bibliographic description of the INIS record is corrected independently from the subject descriptions, since each is the responsibility of a special group not necessarily working at the same speed. Because of this, the system has been designed in such a way that the two units can work completely independently of one another. This allows even distribution of the workload during an INIS cycle.

At the end of each cycle a set of programmes provides for the automatic synchronization of the four files (see Figure 4). These programmes produce the *INIS Atomindex* file, and make the necessary adjustment to the four basic files, so that a new cycle can be started. The *INIS Atomindex* file is the source for the INIS output products, i.e. the *INIS Atomindex* and the INIS magnetic tapes.

The computer logs have shown that the average processing time per INIS record (*without* checking of index terms) is fifty-two seconds. This time includes all processing from the initial receipt of the record through its distribution on magnetic tape (input–checking–updating–printing–output).

A new set of programmes has been developed which produces *INIS Atomindex* by using computer-driven phototypesetting equipment as was previously mentioned. This has resulted in noticeable quality improvement and a reduction in the amount of paper usage and the production of *INIS Atomindex* in a more standard size.

9. Training

To assist new participants, the IAEA provides two types of training opportunities. One is a three-week seminar covering cataloguing, abstracting, and indexing, including related computer demonstrations.

Additional training is provided on-the-job at IAEA Headquarters in Vienna for varying periods of time based upon specific needs of selected individuals.

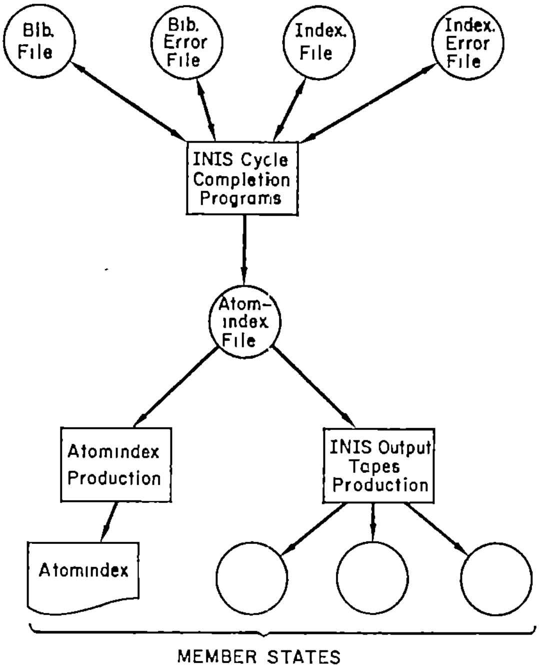


FIG. 4: *INIS computer system—production*

In each form of training, a limited supply of funds has been available to provide partial support for individuals from developing countries. To provide a more complete training programme, particularly in recognition of the need for self training, an additional aid is being developed. This is the development of programmed learning courses in the critical aspects of INIS input—descriptive cataloguing, indexing, and abstracting. The first course in this series—descriptive cataloguing—should be available by early 1972 if the testing programme proceeds as anticipated. If this anticipation bears true, then the courses in abstracting and indexing should follow soon afterwards.

10. Problems and solutions

As can be expected in any new system regardless of how well it might be functioning mechanically, there are always areas where improvements can be made, and we have our share. I won't spend a great deal of time on each, but will enumerate them, not necessarily in their order of importance, and add a few side remarks.

(1) *Regional or Multi-national Centres*, although strongly recommended by the INIS Study Team and various consultants, have not materialized, nor have many countries indicated interest. Since we believe rather strongly in their use, particularly for developing countries (for both input and output processing purposes), we have, after receiving encouragement from UNDP, entered into discussions and exchanges with Unesco. The nature of the discussions has

covered the establishment of an INIS Regional Information Centre within the structure of an existing centre—national, multi-national, or regional—which currently serves other information interests.

(2) *The INIS Thesaurus*, following independent examination by some of our users and by us, showed some inconsistencies. These were enough to suggest that a detailed examination was required, and this was done by representatives from three Member States and the Agency. The results will be put before a working group consisting of six country representatives plus IAEA and Euratom this November for final resolution.

(3) *The Subject Categories and Scope Descriptions* began to show signs of ambiguities. These were first brought to light through the varied interpretations in content placed upon the same categories by different participants. Specialist groups were organized to study these descriptions and revisions will be completed for use beginning on 1st January 1972.

(4) *The microfiche duplicates* prepared by the diazo process proved to be inadequate when used for the preparation of second generation copies. New equipment using a silver-based method is being procured by the end of this year which will take care of most of our complaints. However, we still can do no better than the input provided, and some Member States need to improve the quality of the material they are furnishing before we can reach a completely satisfactory end product.

(5) Complete *coverage* of the world's nuclear information presents a problem in two parts. First there is the inability of some participants to cover everything produced in their country, due to the lack of an organizational entity upon which to build or the inability to find qualified personnel, or the all-too-common general funding problems. Great strides have been made in the past year, which is indicated by the fact that the members inputting have increased from eighteen to thirty-six in the past six months, and the average monthly output products of the system have increased from 800 to 1,200 in the same period. By this time next year, the monthly output should be close to 4,000.

The second factor is the coverage of materials produced by non-member countries, notably the People's Republic of China and the German Democratic Republic.

(6) We have been holding *training seminars* on a regional basis. It appears now that it would be better to hold these only in Vienna where we have all the required facilities and where seminar participation can be effectively followed by on-the-job training to reinforce what has been learned in the 'classroom'. Also, some of our members have suggested summer training or refresher courses, and some advanced countries have offered their facilities for training.

(7) Finally, *SDI and retrospective searching* are our major challenges for the near future. On SDI we are doing some in-house work at the Agency's Headquarters in Vienna and hope to develop useful profiles next year, while at the same time testing the effectiveness of our indexing programme. Our schedule for retrospective search development will not be firmed up until we see how the SDI work progresses. Of course, we will be receiving reports from some of our more advanced Member States who are proceeding in these areas independently and better co-ordination is called for.

11. INIS and libraries

Since I understand that most of you present are librarians or are closely associated with library activities, I should, before concluding, provide some thoughts on what INIS means to you now and in the future. This, I think, is particularly necessary since the system was not developed strictly with librarians in mind. Nonetheless, there is application to special libraries in the nuclear science field or those serving nuclear science interests along with other disciplines. For example:

(1) *INIS Atomindex*, once it covers full scope, presents a challenge to *NSA* as the standard 'shelf-list' or document identification and location tool in libraries—it should have more up-to-date information and broader coverage than *NSA* since the member countries are required to survey their own literature.

(2) All non-conventional literature (not just technical reports as with *NSA*) is readily available to libraries on standing order from the INIS Clearinghouse—this is a great boon to libraries in developing countries.

(3) Libraries in INIS member countries should eventually be able to look upon their national INIS centre as a specialized information source and derive special services from it, such as SDI and retrospective retrieval. If desired and capable of using them, libraries may get INIS tapes themselves to perform these services.

(4) INIS as a major sub-system of UNISIST, is paving the way for world-wide bibliographic standards to achieve compatibility and convertibility in such service organizations as libraries.

(5) The decentralized concept of inputting literature by Member States can have far-reaching effects on the structure of input preparation within countries. It may be postulated that the most economic approach for each country is to create a centralized input centre where all bibliographic data is keyboarded just once for all disciplines and then distributed to network members such as INIS for merging into a subject- or mission-oriented tape. Accordingly, this central inputting centre would also be responsible for preparation of a country's *national bibliography* used by all libraries as an acquisition tool.

12. Summation

In summation, let me say that INIS has all the appearances of a going system, with the usual aches and pains. Our routines are well established and, as a maximum, items remain no more than two months in the pipeline between the Member States' centre and their appearance in *INIS Atomindex*. The current major problems have solutions that are forthcoming soon. However, some very serious trials are still ahead of us as we begin to test the file for SDI and retrospective retrieval purposes. This is when we will really begin to learn if decentralized input is practical for a large multi-national system, and it is why we are placing so much effort on subject category description and thesaurus improvement; on error checking; and in pointing out to participants where they are falling short. We are confident, though, that the co-operative spirit which caused the system to be established will continue to flourish and sustain us during any troublesome periods ahead.

Acknowledgement
I would like to acknowledge the assistance of IAEA staff members in the preparation of this paper, namely: Messrs Del Bigio, Gottschalk, Hunt, Sheel, and Turkov.

DISCUSSION

MR B. T. STERN (Wellcome Foundation) asked what the response time would be when all the terminals were on-line.

MR ISOTTA replied that this would be about 10–15 seconds, but it was hoped to reduce this to five seconds in the near future.

MRS I. V. WHITE (National Physical Laboratory) asked if it was possible to have on-line connections to installations such as TRC at St Mary Cray which were already on-line to the central computer.

MR ISOTTA said that such an arrangement was already operating In reply to questions from MR D. BISHOP (DoE) he mentioned that the minimum core size for the computer was 140K and that there would be little cost advantage in accepting a slower response time.

MR D. STANLEY (Standard Telecommunications Laboratories) asked why only one forename initial was used in the ESRO author index.

MR ISOTTA replied that this was done purely for reasons of economy.

MR C. OFFOR (J. Walter Thompson) asked if there were any problems in convincing major users of INIS that it was worth contributing to the system. He could see that the smaller countries would think it worthwhile because they stood to gain a great deal from the system Did this lead to imbalance?

MR PELZER replied that the major countries had hitherto depended to a large extent on *NSA* which might or might not continue; they were therefore interested in supporting an alternative system. In any case, all co-operating countries were beginning to see the potential value of INIS

MR J. HALL (UKAEA Culham Laboratory) suggested that the question of user evaluation or efficiency of use should be considered in relation to the ESRO system. He recalled that the NASA RECON system had been investigated some years ago (by D. Meister and D. J Sullivan, NASA CR-918) and asked whether there were any plans for an evaluation for the European operation.

He had in mind two particular kinds of users: first in the present and immediate future, the present system operators who were likely to exploit the power of the system to the full; secondly, in the ensuing years, the self-service user who might use the system (as he used conventional indexes at present) in a rather inefficient way.

In reply MR ISOTTA said at a later stage a tutorial device might be included in the RECON system to explain to the user how best to use the system. He thought that the intensive nature of the device would lead to more thorough searching habits than would be the case with a conventional catalogue.

MR M. R. GERSHON (Civil Service Department) asked to what extent the RECON software was available to people designing on-line systems in other subject areas.

MR ISOTTA replied that both versions of the system were available.

MR A. A. WINTERS (NOBIN) asked what was the main criterion for the selection of files other than the original NASA file and to what extent would file merging be carried out in the future.

MR ISOTTA said that the selection had been somewhat arbitrary. The NASA file was a very large one and the main interest had been in selecting smaller files which contained material not included in the NASA files but close to NASA interests. Merging presented a real problem. On the one hand, merging would reduce overlap and therefore reduce the processing cost. On the other hand, one very large data base would be much less flexible. One solution might be to continue to store the files separately but with duplicates eliminated. This, however, would mean searching all the files for some types of enquiries. No final solution had yet been found.

MR T. AITCHISON (INSPEC) asked if, given the opportunity, and in the light of their present experience, INIS would still choose a controlled language. He also asked on what basis the two-month delay in the production of *Atomindex* was calculated.

MR PELZER replied that they would still choose controlled language, but were keeping a close watch on developments in systems using natural language. The two-month delay was measured from the time the information left the national centre producing the input to the time when it was printed out in *Atomindex*.

MR F. MATTHEWS (ICI) asked about the relevance of the answers: were there statistics on the average number of postings per document and did INIS hope to improve the discrimination of the answers?

There were no statistics available for INIS, but MR ISOTTA said that ESRO had looked at the possibility of a term ranking system as a way of improving relevance. The number of postings per document differed greatly between the various files: NASA using ten to twelve postings, others using fewer. Some used only title words or citations. Selection of relevant items by the user was greatly helped by the speed of response on the interactive terminal.

MR A. J. DICKSON (Ealing Technical College) asked whether the use of COM was being studied for either system.

MR ISOTTA replied that this technique was being studied, especially as a possible means of issuing the data bank in the form of microfiche to users. COM was not yet being studied for INIS.

MR R J FULFORD (British Museum) asked if the speakers anticipated that the systems would ever suffocate under the sheer weight of data after several years of operation. Would it be necessary to 'draw a line' and start a new file? Was selective withdrawal of outdated material possible?

MR PELZER's answer was that the present maximum number of entries per year to INIS of 85,000 was not very great and, bearing in mind technological advancement in storage systems, should present no great problem.

MR ISOTTA thought that files of the order of 300,000 items per year might create problems. It might be possible to extract the older material and run it less frequently, depending on the demand. ESRO had done some work on planning a statistical system which would indicate which files to select for less frequent use. THE CHAIRMAN reminded delegates that one of the most economical ways of storing and searching older and lesser used material was by the use of the printed indexes.

CURRENT AWARENESS LIST

Recent additions to the Aslib library catalogue are broken down into twelve broad groups, whose coverage is indicated below. These groups are not mutually exclusive but it is hoped that users will find them helpful in scanning for new items of interest.

User Studies
Analyses of information-seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory.

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject Organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies; reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies; directories.

JANET WALKLEY
Librarian

CURRENT AWARENESS LIST

*Items are available in the Aslib Library and may be borrowed unless marked * to indicate reference copies.*

User Studies

INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session three: information analysis: preprint. [Tel Aviv]: ISLIC, [1971].
63p.

KOCH, H. WILLIAM *and* GRATTIDGE, WALTER
Marketing the products and services of information analysis centres. New York. American Institute of Physics. Physics Information Division, [1971].
22p. (AIP ID 71 2)

SNOWBALL, GEORGE J.
Survey of social sciences and humanities monograph circulation by random sampling of the stock.
Canadian Library Journal, vol.28, no. 5, September–October 1971, p.352–60.
Results of a survey conducted in July 1970 at Sir George Williams University Library.

MEHLAN, HEIDRUN
Der Nutzen der Informationstatigkeit fur die Forschungs—und Entwicklungsarbeit: Beispiel: Weiterentwicklung einer Grossrundstrickmaschine.
Informatik, vol.18, no.5, 1971, p.10–12.
The use of information in research and development, illustrated by the development of a mass-producing knitting machine.

LEBEDEV, A. N.
Opyt raboty po otsenke informatsionnoĭ deyatel'nosti predpriyatiĭ i organizatsiĭ sel'skogo khozyaĭstva.
Nauchno-Tekhnicheskaya Informatsiya, Seriya 1, no.9, 1971, p.11–12.
Evaluation of the information service at a Russian agricultural enterprise.

BUNTROCK, H.
Some results of an inquiry into agricultural documentation services.
In
INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session two: information systems for specialized applications: pre-print. 1971.
p.27–35.

PAPIER, LAWRENCE
Approaches to establishing dimensions and criteria for evaluation of review publications.
In
INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session three: information analysis: preprint. 1971.
p.27–45.

Communication and Knowledge

ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT
Information for a changing society: some policy considerations. Paris: the Organisation, 1971.
48p.

RICHTER, ERICH
ISO/TC46 tagte in Lissabon.
Dokumentation, Fachbibliothek, Werksbücherei, vol.19, no.6, Sept/Oct 1971, p.221–3.
Meeting of the International Organization for Standardization/Technical Committee 46—Documentation in Lisbon.

BRENNER E. H.
Some levels of interaction in information science.
Information Storage and Retrieval, vol.7, no.5 December 1971, p.211–15.
Clarifies existing interactions: between government and industrial services; between discipline- and project-oriented services; on a national versus international level; and between the user and the computer.

EVANS, LUTHER H. *and* VAMBERY, JOSEPH T.
Documents and publications of contemporary international governmental organizations.
Law Library Journal, vol.64, no.3, August 1971, p 338–8–62.
Dissemination of information by intergovernmental bodies, mainly by the United Nations and agencies. Includes classification scheme for their arrangement.

JONES, KATHLEEN
The teaching of social administration in universities: how librarians could help.
Library Association Record, vol.73, no.1, November 1971, p.205–6.
An account of the rapid growth of a relatively new area of knowledge, and some of the problems in information storage and retrieval.

BROWN, JACK E.
CAN/SDI plus two—Canada's national SDI service for science and technology.
In

INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session eight: commercially available services: pre-print. 1971.
p.9–18.

BRADLER, REINHARD
Bemerkungen uber das Wesen der Information. *Informatik*, vol.18, no.5, 1971, p.16–18.
The philosophical framework of information.

Information Processing Systems

AITCHISON, T. M. *and* HALL, ANGELA M.
Evaluation of retrieval effectiveness.
In
INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session five evaluation of retrieval effectiveness pre-print. 1971.
p.57–68.

INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session five: evaluation of retrieval effectiveness: pre-print. [Tel Aviv]: ISLIC, [1971].
84p.

CHERNYAVSKII, V. S.
O probleme otsenki poiskovykh sistem: chast' 2: statisticheskaya otsenka poiskovykh sistem: o nulyakh znakovogo kriteriya. *Nauchno-Tekhnicheskaya Informatsiya, Seriya* 2, no.9, 1971, p.25–34.
The evaluation of retrieval systems by statistical means.

TELL, BJORN V.
Retrieval efficiency from titles and the cost of indexing.
Information Storage and Retrieval, vol.7, no.5, December 1971, p.241–3.
By the means of a flexible machine search system three experiments have been made in order to test the retrieval efficiency of searching free text and keywords.

MAHNER, WALTER
Weitere Programme fur die Erhöhung der Effektivitat der Informationstätigkeit.
Informatik, vol.18, no.5, 1971, p.34–7.
The systemization of abstracting classification, information retrieval and other aspects of information processing.

SCOTT, E. J., TOWNLEY, H. M., *and* STERN, B. T.
A technique for the evaluation of a commercial information service and some preliminary results from the Drugdoc Service of the Excerpta Medica Foundation.
Information Storage and Retrieval, vol.7, no. 4, November 1971, p.149–65.
Assesses the selectivity, timeliness and quality of the Drugdoc service.

SCHRODT V. N.
Information communication system.
Journal of Chemical Documentation, vol.11, no 3, August 1971, 174–8.
An existing information storage and retrieval system was revised to serve as a vehicle for the communication of chemical and biological information among members of the Agricultural Research and Development Department.

ORBAN, DIETRICH–PETER
Das Zusammenwirken der Information Wissenschaft und Technik, mit dem Neuerer-, Patent-, Muster- und Kennzeichnungswesen.
Informatik, vol.18, no.5, 1971, p 13–15.
The need for patent and specification systems to co-operate in the dissemination of information.

DYNIN, I. A.
Algoritmizatsiya poiska indeksov v tavlitsakh UDK.
Nauchno-Tekhnicheskaya Informatsiya, Seriya 1, no.9, 1971, p.13–17.
The possibility of applying an algorithmic procedure to number searching in UDC tables.

RUDORF, DIETER
Teilautomatisierte Sichtlochkartei zur Speicherung und Recherche von Informationen.
Informatik, vol.18, no.5, 1971, p.45–6.
An optical coincidence card system using a photo-electric search apparatus.

PETRARCA, ANTHONY E., *and others*
Use of the double-KWIC coordinate indexing technique for chemical line notations.
Journal of Chemical Documentation, vol.11, no.3, August 1971 p.148–53.
Study was performed on three notations for comparative purposes.

CREIGHTON, REGINALD A., *and* CROCKETT, JAMES J.
SELGEM: A system for collection management. *Information Systems Innovations,* vol.2, no.3, August 1971, 24p.
Includes: design criteria, information storage and retrieval, file update program, SELGEM report writer, editing, paper tape input, thesaurus processing bibliographic indexing.

ZENICH, MARGARETT B.
The TISA Plan.

In
INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session two: information systems for specialized applications: pre-print. 1971.
p.37–41.

BONPAS, M.
La notion de compatibilité des systèmes de documentation automatique.
Information Storage and Retrieval, vol.7, no.4, November 1971, p.189–5.
The compatibility property of a documentation system is defined by the capacity of the system to postulate relationships of equivalence.

SKOV, HELGE J.
The costs of documentation services based on magnetic tapes: basis for the choice of price policy: Scandinavian conference in Copenhagen, 28th–29th October 1970.
In
INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session eight: commercially available services: pre-print. 1971.
p.19–34.

LUCKE, WERNER *and* LIST, DIETER
Aufgaben und Stellung der Informationseinrichtungen in einem Fuhrungsbereich.
Informatik, vol.18, no.5, 1971, p.5–6, 8–9.
The role of management information systems in the East German economy.

Language and Indexing

LEONT'EVA, N. N.
Sozdanie informatsionnogo yazyka na baze semanticheskogo analiza teksta.
Nauchno-Tekhnicheskaya Informatsiya, Seriya 2, no 8, 1971, p.8–15.
Creating an information retrieval language on the basis of semantic text analysis.

GLADKII, A. V.
Opisanie sintaksicheskoi struktury predlozheniya s pomoshch'yu sistem sintaksicheskikh grupp.
Nauchno-Tekhnicheskaya Informatsiya, Seriya 2, no.9, 1971, p.35–8.
Description of sentence syntactic structure with the aid of a system of syntactic groups.

UHLMANN, ALADÁR
Bányászati tezaurusz fogalomgyujtemény az eto azakjelzeteivel.
Tudományos és Müszaki Tájékoztatás, vol.18, no.10, October 1971, p.765–80.
A mining thesaurus with UDC notations.

*SECRÉTARIAT DES MISSIONS D'URBANISME ET D'HABITAT
Thésaurus du SMUH: I: Lexique des descripteurs définition et relations sémantiques.
Paris: the Secrétariat, July 1971.
iv. (var.pag.)

*SECRÉTARIAT DES MISSIONS D'URBANISME ET D'HABITAT
Thésaurus du SMUH: II: Liste alphabétique des descripteurs et termes rattachés.
Paris: the Secrétariat, July 1971.
134p.

*SECRÉTARIAT DES MISSIONS D'URBANISME ET D'HABITAT
Thésaurus du SMUH: III: Tableaux des catégories de descripteurs. Paris: the Secrétariat, [July 1971].
1 portfolio.

KERIMOV S. K. *and others*
Ispol'zovanie mashinnogo slovarya v IPS 'ARGON'.
Nauchno-Tekhnicheskaya Informatsiya, Seriya 2, no.8, 1971, p.16–18.
The use of a machine dictionary of descriptors in the 'ARGON' IRS.

KRALLMANN, D.
Towards the development of a cumulative dictionary within a dynamic information system.
In
INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session three: information analysis: pre-print. 1971.
p.57–60.

DESCAMPS, J. L.
Vers un dictionnaire contextuel: classement d'un corpus traitant de géologie.
TA Informations, no.1, 1971, p.1–33.
A contribution towards compilation of a contextual dictionary: organization of a body of geological information.

MØLGAARD-HANSEN, R.
On compatibility and complementarity between indexing languages: synopsis.
Tidskrift for Dokumentation, vol 27, no.5, 1971, p.57–81.
Lecture held at the Meeting of the Polish Classification Research Group in Warsaw on 9th October 1970.

GRAY, W. A., *and* HARLEY, A. J.
Computer assisted indexing.
Information Storage and Retrieval, vol.7, no.4, November 1971, p.167–74.
Technique enables an on-line computer-based information retrieval system to aid the indexers by selecting possible index terms to be assigned to a new document entering the system.

DIETZE, JOACHIM
Information and automatisches Indexieren.
Informatik, vol.18, no.5, 1971, p.23–27.
Various statistical and syntactical methods of automatic indexing.

SPRANGER, URSULA
Über einige Verfahren des automatischen Indexierens.
Informatik, vol.18, no.5, 1971, p.28–30.44.
Various experiments in automatic indexing.

NEGOIŢĂ, C. V.
On the notion of relevance in information retrieval. Bucharest: National Council for Science and Technology (Rumania), July 1971.
13p.

WOOD, D. N.
An evaluation of some abstracting and indexing services in the earth sciences.
NLL Review, vol.1, no.4, October 1971, p.113–118.
Report of an investigation into the coverage and extent of overlap of abstracting and indexing services in the earth sciences.

BRITISH STANDARDS INSTITUTION
Draft British standard specification for the romanization of Japanese (final version). [London]: the Institution, August 1971.
13p. (71/80409).

LÖHR, HAROLD
Transliteration japanischer worter über die kyrillische in die lateinische Schrift.
Informatik, vol.18, no.5, 1971, p.48–52.
Transliterating Japanese characters into the Latin alphabet via Cyrillic script.

SMIRNOV, I. P.
Tvorcheskie sily perevodchikov na sluzhbu nauchno-tekhnicheskogo progessa.
Nauchno-Tekhnicheskaya Informatsiya, Seriya 1, no.9, 1971, p.23–4.
Training of technical translators.

Classification and Cataloguing

BRITISH INSTITUTE OF MANAGEMENT
Classification and coding: an introduction and review of classification and coding systems: [prepared by W. MacConnell]. London: the Institute, 1971.
[iii], 31p. (Management guide no. 1)

BARTH, FRITZ-GEORG
Alphabetisch und systematisch geordnete Karteien in Kleinen Fachbibliotheken: wichtige Arbeitsmitten fur Informations– und Auskunftstatigkeit.
Zentralblatt fur Bibliothekswesen, vol.85, no.10, October 1971, p.602–9.
Author and classified catalogues in small special libraries.

FIELD, B. J.
An integrated classification and indexing scheme for physics, electrotechnology, computers and control.
In
INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971.
Session three: information analysis: preprint, 1971. p.13–19.
Describes INSPEC's integrated system.

JARDINE, N., *and* RIJSBERGEN, C. J. VAN
The use of hierarchic clustering in information retrieval.
Information Storage and Retrieval, vol.7, no.5, December 1971, p.217–40.
Introduces information retrieval strategies which are based on automatic hierarchic clustering of documents.

BRITISH STANDARDS INSTITUTION
Universal decimal classification: English full edition: 4th international edition: UDC 665: oils, fats, waxes. London: the Institution, 1971. 580–06752–1.
28p. (BS1000[665]: 1971; FID publ. no.179).

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE. Centre de Documentation.
Bulletin signalétique: plan de classement. vol.33, 1972. Paris: the Centre, [1971].
viii, 76p.

TAIT, JAMES A. *and* ANDERSON, DOUGLAS
Descriptive cataloguing: a student's introduction to the Anglo-American cataloguing rules. 2nd edition.
London: Bingley, 1971. 0 85157 119 0.
122p.

KAULA, P. N.
Battle of cataloguing rules.
Herald of Library Science, vol.10, no.3, July 1971, p.243–6.

KOUL, R. K.
Canon of recall value and other canons of cataloguing: a conflict and compromise.
Herald of Library Science, vol.10, no.3, July 1971, p.247–54.
Normative principles applicable to cataloguing.

HUSE, R. J.
Computers in the counties.
Catalogue and Index, no.23, Autumn 1971, p.7–9.
Abridged from a paper given at the Cataloguing and Indexing Group Seminar

'Towards Total Automation', London, April 1971.

FAWCETT, TREVOR
Short titles: rules for a computer based short title catalogue.
Catalogue and Index, no.23, Autumn 1971, p.4–5.
Development of short title catalogue at the University of East Anglia Library.

JAYARAJAN P.
Entry element in the name of a university.
Library Science with a Slant to Documentation, vol.8, no.3, September 1971, p.279–87.
The form of catalogue headings for names of universities.

Mechanization

INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session nine: processing for automation I: pre-print. [Tel Aviv]: ISLIC, [1971].
55p.

INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session ten: processing for automation II: pre-print. [Tel Aviv]: ISLIC, [1971].
23p.

REINICKE, WILLI
Der Einfluss der Aktualität von Informationen auf die Pflege und Struktur von Datenbanken.
Informatik, vol.18, no.5, 1971, p.19–22.
The influence exerted on file maintenance programmes by the obsolescence of information stored in computer systems.

FELDMAN, R. J., *and* KONIVER, D. A.
Interactive searching of chemical files and structural diagram generation from Wiswesser line notation.
Journal of Chemical Documentation, vol.11, no.3, August 1971, p.154–9.
Describes systems employing bit screens, which are useful for filtering a file.

HARLEY, A. J.
Dialogue with a computer.
NLL Review, vol.1, no.4, October 1971, p.123–136.
Description of a Medlars dialogue.

CARVILLE, M., HIGGINS, L. D., *and* SMITH, FRANCES J.
Interactive reference retrieval in large files.
Information Storage and Retrieval, vol.7, no.5, December 1971, p.205–10.
Describes the design criteria for an on-line system based on experiences of a pilot system which has been operational for 2 years.

AXHAUSEN, WALTER E. A. *and* WESSEL, ANDREW E.
Machine-aided indexing and analysis for document and fact retrieval: [PRIMAS]
In
INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session ten: processing for automation II: pre-print. 1971.
p.17–23.

HISINGER, B.
A multidisciplinary and computerized SDI Service for industry and research: practical experience and costs.
Information Storage and Retrieval, vol.7, no.4, November 1971, p.175–87.
Experiences, costs, price policy, marketing, sales promotion and foreign cooperation of a Danish documentation department are described.

HIRSCH, RICHARDS S.
Functions and economics of an operating automated library system.
In
INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session four: economics of information systems: pre-print. 1971.
p.1–6.

BATTEN, W. E.
The impact of economics on system design.
In
INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session four: economics of information systems: pre-print. 1971.
p.29–38.

BUTLER, M. K., *and others*
Access [Argonne Code Center Exchange and Storage System]: automation progress at the Argonne Code Center.
In
INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session 9: processing for automation 1: pre-print. 1971.
p.1–14.

THOMAS, JOHN T.
Automation feasibility study of the North Carolina Agricultural and Technical State University Library.
Indian Librarian, vol.26, no.1, June 1971, p.5–12.
Gives details and description of computerised acquisition procedure.

MAUERHOFF, GEORG., *and* SMITH RICHARD G.
A MARC II-based program for retrieval and dissemination.

Journal of Library Automation, vol.4 no.3, September 1971, p.141–58.
Reviews work on batched retrieval/dissemination and describes SDI system developed by Library, University of Saskatchewan, and the National Science Library.

GEIVANDOV, E. A. *and* SHOLOKOV, V. G.
Sistema vyvoda khimicheskoĭ informatsii v avtomatizirovannoĭ informatsionno-poiskovoĭ sisteme v vide dvumernogo izobrazheniya strukturnykh formul.
Nauchno-Tekhnicheskaya Informatsiya Seriya 2, no.8, 1971, p.22–3.
A chemical information output system in an automatic IRS with two-dimensional structural formulae representation.

SKOLNIK, HERMAN
The what and how of computers for chemical information systems.
Journal for Chemical Documentation, vol.11, no.3, August 1971, p.185–9.
Discusses computer logic and the designing of a chemical information system for computer processing.

BOND, V. B., *and others.*
Interactive searching of a structure and biological activity file.
Journal of Chemical Documentation, vol.11, no.3, August 1971, p.168–70.
Interactive search using a time sharing system on a large file which contains structural information in the form of fragments based on the Wiswesser Line Notation.

Subject Organization

GORISCH, RUDHOLF, *and* THIEDE, ELFRIEDE
Die Arbeit der Zentralen Bibliothek der Medizinischen Akademie—Medizinische Bezirksbibliothek-Mogdeburg.
Zentralblatt für Bibliothekswesen, vol.85, no. 11, November 1971, p.669–72.
The work of the Central Library of the Medical Academy (Medical District Library) in Magdeburg (GDR).

RÓZSA, GYŐRGY
Tőrténeti gyutemények és nemzetközi információs kőzpont: az ENSZ genfi könyvtara.
Tudományos és Muszaki Tájekoztatás, vol.18, no.10, October 1971, p.745–58.
The United Nations Library at Geneva—an historical collection and an international information centre.

THORNTON, JOHN L.
Medical libraries and research.
British Journal of Hospital Medicine, vol.6, no.3, October 1971, p.485–90.
Includes names of medical libraries in U.K.; discusses organization of stock and bibliographical tools.

JACOB, HELENA
Nice books and museum libraries.
Canadian Library Journal, vol.28, no.5, September–October 1971, p.383–4.
Functions of museum libraries.

HAMILTON, PETER
Member Profile: Beecham Research Laboratories.
SASLIC Newsletter, no.9, November 1971, p.5–7.
Library and information services.

BREEM, W. W. S.
Professional law libraries of Great Britain.
Law Library Journal, vol.64, no.3, August 1971, p.278–90.
History and present situation of British law libraries.

SCOTT, MARIANNE
Law libraries in Canada.
Law Library Journal, vol.64, no. 3, August 1971, p.314–22.
History and present situation of Canadian law libraries.

INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session two: information systems for specialized applications: pre-print.
[Tel Aviv]: ISLIC, [1971].
41 (i.e. 31) p.

INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session eight: commercially available services: pre-print. [Tel Aviv]: ISLIC, [1971]. 48p.

*RODGERS, FRANK
Serial publications in the British parliamentary papers, 1900–1968: a bibliography. London: Library Association, 1971. 85365-494-8.
xix, 146p.

PERREAULT, JEAN M.
Reflections on the idea of a universal bibliography.
Herald of Library Science, vol.10, no.3, July 1971, p.214–21.
Explains concepts of bibliography and universal bibliography.

VICKERY, B. C.
The many uses and forms of subject representation.
In
INTERNATIONAL CONFERENCE ON INFORMA-

TION SCIENCE, Tel Aviv, 1971
Session three: information analysis: pre-print. 1971.
p.47–55.

Reprography

CROSS, B. C.
Reprographic equipment at the NLL.
NLL Review, vol.1, no.4, October 1971, p.119–122.
The equipment and procedures adopted by the National Lending Library for production of photocopies and microforms.

GRUNDY, C. C.
Facsimile communication in the Department of Employment.
O & M Bulletin, vol.26, no.4, November 1971, p.217–22.
Facsimile transmission to circulate details of vacancies notified to Employment Exchanges.

HJERPPE, ROLAND
FIB eller fakta i bild eller faksimil i bibliotek: del 2.
Tidskrift för Dokumentation, vol.27, no.5, 1971, p.59–60.
Telefacsimile in libraries: part 2.

Printing and Publishing

ELLIS, GEORGE
Units, symbols and abbreviations: a guide for biological and medical editors and authors: recommendations of a working party set up at a conference of medical editors held in London on 2nd December 1968. London: Royal Society of Medicine, May 1971. 950–1555–0–0
36p.

INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971.
Session seven: publishing and reprography. pre-print. [Tel Aviv]: ISLIC, [1971].
52p.

MARTIN, M. D.
Mechanization of publications.
In
INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session seven: publishing and reprography: pre-print. 1971.
p.41–8.
Describes the computerization of INSPEC publications.

WOLFF, MANFRED E.
Privacy transmission of scientific information: today and tomorrow.
Journal of Chemical Documentation, vol.11, no.3, August 1971, p.137–8.
Content of medicinal chemical journals is discussed and changes in the future are considered.

Administration and Management

INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session four: economics of information systems: pre-print. [Tel Aviv]: ISLIC, [1971].
55p.

ZAAIMAN, R. B.
A breakdown of manpower costs in relation to tasks in an industrial information service.
In
INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session four: economics of information systems: pre-print. 1971.
p.15–27.

JENKINS, HAROLD R.
The ABC's of PPB.
Library Journal, October 1971, p.3089–93.
An explanation of how Planning-Programming-Budgeting can be used to improve the management of libraries.

PROHL, PETER, SCHILD, JOHANNES, *and* TZSCHASCH, PETER
Das Bibliotheks—und Informationswesen an den sowjetischen Universitaten und Hochschulen und die Bauplanung wissenschaftlicher Bibliotheken in der UDSSR.
Zentralblatt fur Bibliothekswesen, vol.85, no.11, November 1971, p.641–53.
Soviet university libraries and information systems; building projects for scientific libraries.

KUSKE, GUNTRAM, *and others*
Optimale Nutzung von Buchermagazinen.
Dokumentation, Fachbibliothek, Werksbucherei, vol.19, no.6, September–October 1971, p.205–12.
Compact shelving at the Medical School/Hanover University and at the University Library/Hanover.

[STATISTICS of Australian higher education libraries.]
Australian Academic and Research Libraries, vol.2, no.4, September 1971, p.123–36.
Statistical tables for staff and services in Australian university libraries, college of advanced education libraries and secondary teachers college libraries.

REVILL, D. H.
The video revolution.
New Library World, vol.73, no.857,

November 1971, p.135, 137–138.
A survey of new video equipment and problems concerning its use in libraries.

Library Systems

INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session one: international and national information networks: pre-print. [Tel Aviv]: ISLIC, [1971].
77p.

WYSOCKI, ADAM
World Science Information Systems: UNISIST
In
INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session one: international information networks: pre-print. 1971.
p.37–45.

GARFIELD, EUGENE *and* MALIN, MOTTON V.
The international network of ISI-linked national information centres.
In
INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session eight: Commercially available services: pre-print. 1971.
p.1–7.

LEBOWITZ, ABRAHAM I.
Some factors relating to the economic basis of international systems for information storage and retrieval.
In
INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session four: economics of information systems: pre-print. 1971.
p.49–54.

INTERGOVERNMENTAL CONFERENCE FOR THE ESTABLISHMENT OF A WORLD SCIENCE INFORMATION SYSTEM.
IFLA News, no.38, November 1971, p.20–1.
Gives details of comprehensive resolutions concerning UNISIST.

FENDRYCH, MIROSLAV, *and* FOGL, JIRI
The Czechoslovak computer information system ASTI.
Information Storage and Retrieval, vol.7, no.5, December 1971, p.245–8.
Describes the State Information Policy which aims at the construction of a unified, integrated national system of scientific, technological and economic information.

ROBERTS, NORMAN
University libraries
Library Association Record, vol.73, no.1, November 1971, p.210–2.
Fourth in a series of articles written in response to the Editor's request to the University, College and Research Section.

WAGNER, MADELEINE
La section pharmacie de la Bibliothèque universitaire de Montpellier.
Bulletin des Bibliothèques de France, vol.16, no.8, August 1971, p.421–54.
The pharmacy department of Montpellier University Library.

WAY, DEREK J.
University law libraries of Great Britain.
Law Library Journal, vol.64, no.3, August 1971, p.291–301.
History and present situation of British university law libraries.

Professional Activity

THOMPSON, ANTHONY
Five years of IFLA, 1966–1970.
Herald of Library Science, vol.10, no.3, July 1971. p.233–43.
Describes objectives, membership, General Council and the members of the Executive Board.

INTERNATIONAL CONFERENCE ON INFORMATION SCIENCE, Tel Aviv, 1971
Session six: selection, education and training of personnel: pre-print. [Tel Aviv]: ISLIC, [1971].
84p.

RUSSELL, JOHN
Graduate training.
New Library World, vol.73, no.857, November 1971, p.126–7.
Outline of the graduate training scheme operated by Manchester Public Libraries.

HOGUE, M. B.
From books to benefits.
Australian Academic and Research Libraries, vol.2, no.4, September 1971, p.116–22.
An attempt at defining parameters for a cost-benefit analysis of in-service library training.

CLEMENTS, D. W. G.
Survey of students of librarianship and information science completing courses during December 1970.
Library Association Record, vol.73, no.1, November 1971, p.207–9.
Indicates that overall employment position has not deteriorated.

SHARMA, C. D.
Library science education in United States,

Canada, Great Britain and India: patterns, equivalences and illusions.
Herald of Library Science, vol.10, no.3, July 1971, p.222–33.

WALKER, GREGORY
Directory of libraries and special collections on Eastern Europe and the U.S.S.R. London: Crosby Lockwood *for* SCONUL. Slavonic and East European Group, 1971. 0 258 968370.
159p.

ASSOCIATION NATIONALE DE LA RECHERCHE TECHNIQUE. Commission Information et Documentation.
Centres français de documentation scientifique et technique: domaines d'activité et liste des responsables. Paris: the Association, [1971]. [ii]. 211p.

MEMBERS' ADVERTISEMENTS

Acceptance of advertisements for publication in Proceedings *does not imply Aslib support for or endorsement of the goods or services advertised.*

Members' advertisement rates: first 15 words (minimum), 50p; 3p for each additional word. 10p if box number required. (No agency discount.) A separate section of these columns is available to non-members at £3 per s.c.i.

Translations services

MEDICAL AND HIGHLY SPECIALIZED SCIENTIFIC TRANSLATIONS. S.M. Bonnekamp, FIL, Member of the Translators' Guild (Med. Science & Lit.), 47 Firs Close, Muswell Hill, London N10. Tel. 01-883 3962 during office hours. After office hours an automatic telephone answering machine will record messages.

BUILDING AND CIVIL ENGINEERING TRANSLATIONS from Russian and German into English. G. L. Cairns, MA, 92 Southwood Lane, London N6. Tel. 01-340 8990.

TECHNICAL SWEDISH, DANISH, NORWEGIAN translated by J. T. Craddock, B COM, FIL, Ekard, Ray Park Avenue, Maidenhead, Berks. Maidenhead 24931.

RUSSIAN/ENGLISH TRANSLATIONS. Twenty years' experience Government Department. Native Russian. A. de Merindol, 19 Ingelow House, Kensington, W8. 01-937 6788.

JAPANESE/ENGLISH RUSSIAN/ENGLISH translations. Chemistry, medicine, biology, zoology. D. A. Fraser, BA, MIL, 22 Gresley Road, London N19 3JZ. Tel: 01-272 5664.

WILFRED E. GOODAY, ARSM, DIC, C.ENG, MIMM, FIL. Member of Translators' Guild, Romanian and French. 161 Rivermead Court, London SW6. RENown 1912

RUSSIAN / ENGLISH TECHNICAL TRANSLATIONS. Chemical, metallurgical and related subjects. D. E. Hayler, 86 Manton Drive, Luton, LU2 7DL. Tel. Luton 25238.

SCIENTIFIC TRANSLATIONS FROM JAPANESE, CHINESE, RUSSIAN, CZECH and East and West European languages into English and/or German. A. K. Henn, B SC, 'Glenside', Lower Leigh Rd., Pontnewynydd, Pontypool, Mon. Tel. Pontypool 3689 (after 6 p.m.).

MEDICAL, PHARMACEUTICAL, BIOLOGICAL translations from French, Romanian and Portuguese into English and from English into French and Romanian, Dr. J. Jacobson, 94 Temple Fortune Lane, NW11. 01-455 1010.

TECHNICAL TRANSLATIONS from Russian, German and Polish into English B. Klipstein, BSC(HONS), 1 Glenview Grove, Shipley, Yorkshire. Tel. Shipley 58215.

TECHNICAL AND COMMERCIAL translations from English into Russian, Mrs O. Linsley, 31 Parke Road, Barnes, London SW13. Tel. 01-748 8822.

TECHNICAL TRANSLATIONS from Japanese into English. R. A. Scutt, BA, 48 Somerset Avenue, West Wimbledon, London SW20. Tel. WIMbledon 1713 (01-946 1713).

TECHNICAL OR COMMERCIAL translations into/from English, German, Dutch and French. A. M. H. Speller, FIL, NGV, 6 Lakeside, West Ealing, London, W13 8HN. Tel. 01-998 1045.

AUTHORITATIVE TECHNICAL TRANSLATIONS. Spanish, French, Italian, German, Portuguese, camera copy or printed. E. W. Sykes, FIL, 39 West Close, Wembley, Middlesex, HA9 9PJ. Tel. 01-904 4273.

Advisory services

IRAS: A NEW ADVISORY SERVICE. As much or as little advice and assistance as you need—anything from a half-day's talk to a six-month's assignment. Miss Helen Townley, I.R. Advisory Services, 117 Wickham Chase, West Wickham, Kent, BR4 0BQ. 01-777 7560.

NON-MEMBERS' ADVERTISEMENTS

Situations vacant

THE MARKET RESEARCH DIVISION of a large petroleum company requires an experienced indexer to work on a part or full time basis (hours by arrangement) for the duration of approximately three months. The job would require the organization and initiation of a post-coordinate optical coincidence indexing system for marketing reports; the compilation, with the division's advice, of a vocabulary of indexing terms and the indexing of a cross section of the reports to test operational efficiency. The job also requires the assemblage of an indexing manual for executives for the future indexing of their own reports and a systems manual for clerks responsible for future punching. Salary by negotiation. Applicants please write to: Box number 172.

INDIA. Central Library, Indian Institute of Technology/Kanpur invites applications from Indian nationals for position of Deputy Librarian. Kanpur Indo-American Program, largest USAID education project in the world, assists in development of IIT/K.

4-storey Central Library is air conditioned; over 100,000 volume collection; growing at 12,000 volumes/year; 1300 current periodical subscriptions. Applicant must have innate craving for innovative activities; be interested in adapting library to electronic information handling system; have personality, disposition to motivate, involve co-workers; have managerial, administrative capabilities; graduate professional degree; and extensive supervisory experience. Knowledge of foreign language desirable. Successful applicant and dependents provided transportation to India. Grade: Rs 700-1250. Apply via air mail: Librarian, Central Library, IIT/Kanpur-16, India.

STOCK ADULT FICTION

Our new catalogue took months to prepare, and we hope it meets your requirements. The books are reinforced by sewing through the original publishers' cases, so adding greater strength to case and sewing. Then the original publishers' jackets are inserted in plastic sleeves.

If eventually this binding should break down then of course you can always send it to us for re-binding.

CEDRIC CHIVERS LTD
PORTWAY
BATH BA1 3NF **Tel. BATH 23201/3**

THE UNIVERSITY OF LANCASTER

ASSISTANT LIBRARIAN

Applications are invited for a new post of ASSISTANT LIBRARIAN (MEDIA SERVICES) within the University Library, from August 1972. Applicants must possess a good honours degree and substantial knowledge and experience of acquisition, storage and exploitation of all types of audio-visual materials; a qualification in librarianship is desirable. Salary will be assessed on the scale £1491–£3417.

Further information may be obtained (quoting reference L.631/B) from the Deputy Secretary and Establishment Officer, University House, Bailrigg, Lancaster, to whom applications (six copies) should be sent not later than 1 March 1972.

Technical Translator

Technical translator (English mother tongue) required by J. F. Williams & Co., Chartered Patent Agents, for work mostly German into English.

Appropriate qualifications and at least two years' experience of technical work required. Salary according to age and experience. Work at present in Central London, but possibly move later to Richmond (Surrey) area.

Contact J. F. Williams,
01-405 6123.

British Technology Index

starts its second 10 years by adding author indexes to monthly parts and the future 1972 cumulation.

BTI indexes, by subject and author, the major articles, papers, reports in British technical periodical publications. Concept indexing with computer aid in providing multiple access points and fast publication.

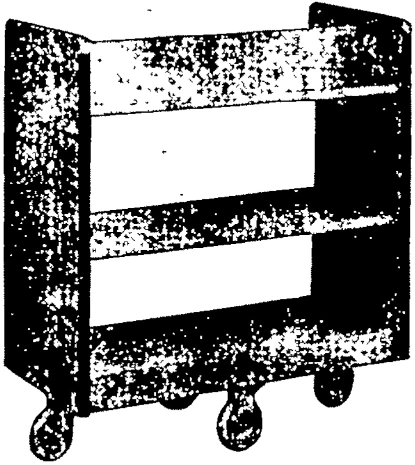
Monthly Parts and Annual Volume; Magnetic tape

THE LIBRARY ASSOCIATION

7 Ridgmount St. Store St. London, W.C.1

(Phone: 01-636 7543)

LIBRARY FURNITURE



Book Trolley
3 ft. 3 ins. high × 3 ft. long × 16¾ ins. Rubber tyred wheels. Ends edged with rubber.

B. Serota Ltd.

Contractors to H.M. Government and to Municipal Authorities

Acme Works, Rendlesham Road, Clapton, London, E5 8PS
Tel. 01-985 1736/1787

First for carpets
Dodson Bull

UP TO 30% DISCOUNT
BRANDED CARPETS

Wilton ● Axminster ● Oriental ● Tufted
● All makes available with full Manufacturers' Guarantees ● NO IMPERFECT GOODS SOLD ● Free delivery in U.K. ● Expert fitting service available most areas.

£200,000 carpets on display
In our extensive London and provincial showrooms
Write stating requirements or for introduction to carpet showrooms in most main cities. Free brochure on request to Dept. ALB

DODSON BULL CARPET CO. LTD
LONDON: 5 & 6, Old Bailey, EC4M 7JD. Tel: 01-248 7971. **BIRMINGHAM:** 164, Edmund St., B3 2HB. Tel: (021)236 5862. **BOURNEMOUTH:** 268, Old Christchurch Rd., BH1 1PH. Tel: 21248. **BRISTOL:** 2-3, Royal London House, Queen Charlotte St., BS1 4EX. Tel: 28857. **LEEDS:** 12, Great George St., LS1 3DW Tel: 41451. **MANCHESTER:** 55-61, Lever St., M1 1DE. Tel: (061) 236 3687/8/9. **NEWCASTLE-upon-TYNE:** 90-92, Pilgrim St., NE1 6SG. Tel: 20321/21428. **WESTCLIFF-on-SEA:** 495, London Rd., SS0 9LG. Tel: Southend 46569.
Open: 9.00-5.30 Mon-Fri. Sat. 9.00-12.00
(Manchester 9.00-4.00)

The 1972 Publications List of

THE LIBRARY ASSOCIATION

has just been produced, listing over 100 titles in bibliography and library science essential to the practising librarian.

Write for a copy to:

PUBLICATIONS DEPARTMENT,
THE LIBRARY ASSOCIATION,
7, RIDGMOUNT STREET,
LONDON WC1E 7AE.

LINGUISTS . . .

**and all concerned with
languages the world over
read:**

**THE
INCORPORATED
LINGUIST**

Annual subscription £2 : Members free

The Institute of Linguists was founded in 1910, and is the only professional and examining body of its kind in the United Kingdom for practising linguists. Members of the Institute—i.e., Associates, Members and Fellows—work as translators, interpreters, language teachers and research workers and in other fields of employment or professions in which high standards of proficiency in languages are required.

THE INSTITUTE OF LINGUISTS
LLOYDS BANK CHAMBERS
91 NEWINGTON CAUSEWAY
LONDON SE1 6BN

Telephone 01-407 4755

Central Electricity Generating Board
Midlands Region

Librarian/ Information Officer **Scientific Services Centre, Ratcliffe on Soar, Nr. Nottingham**

The Librarian will be responsible for the Technical Library which serves both the staff of the Scientific Services Centre and the technical staff throughout the Generating Board's Midland Region and for providing a local information service to the Scientific Services Centre.
Applicants should be graduates and possess an appropriate Librarian's or Information Scientist's qualification.
Salary range: £1,509–£1,848.

Applications should be made in writing, quoting vacancy number A 829/71 MR and giving full details of age, qualifications and experience, and should be forwarded to the Personnel Manager, C.E.G.B., Haslucks Green Road, Shirley, Solihull, Warwickshire, by 4th February 1972.

Technical Translator's Manual

Edited by J. B. SYKES

No book has been previously available in English which could serve as a comprehensive practical reference tool for the tcehnical translator. This manual, therefore, which has been written, compiled and, edited by members of the Aslib Technical Translation Group, will meet a longstanding need among translators of technical material. The ten chapters cover many of the aspects of technical translating, including such topics as: the training of translators; the staff and free-lance translator; the translator's tools; special kinds of translation, e.g, patents, filmscripts etc.; proof-reading and indexing; and the literature on technical translation.

xvii, 173 pp. *SBN: 85142 035 4* *£3.00 (£2.50 to members)*

The Thesaurus in Retrieval

ALAN GILCHRIST

Since Mortimer Taube first introduced Uniterm in the early 1950's, enormous progress has been made in the techniques of coordinate indexing. The concept of a thesaurus, made famous by Roget, and used in an information retrieval context at the 1957 Dorking Conference on Classification has correspondingly developed. The word now encompasses a wide variety of descriptor language types and methods of presentation. This book examines this variety and the way in which thesauri are constructed. The examination is conducted with reference to the indexing devices which affect recall and precision, and is backed up by chapters on coding, formats and aids, searching, evaluation and ten case studies.

viii, 184 pp. *SBN: 85142 036 2* *£4.90 (£3.80 to members)*

Orders to: Aslib, 3 Belgrave Square, London SW1X 8PL

Aslib Publications

18 APR 1972

RSG
GOTHARD GROUP

Technical Scientific Medical

BOOKSELLERS

RICHARD S. GOTHARD & CO. LTD.
RICHARD S. GOTHARD EXPORT CO. LTD.
GOTHARD HOUSE HENLEY-ON-THAMES OXON. RG9 1AJ ENGLAND

Tel: 049 12 3602

Published in England by Aslib, 3 Belgrave Square, London SW1X 8PL.
Printed by Alden & Mowbray Ltd at the Alden Press, Oxford

Aslib Proceedings

CALCUTTA UNIVERSITY

incorporating Aslib Information

45th ASLIB ANNUAL CONFERENCE, DARMSTADT,
October, 1971

Information flow in the construction industry: a study and the development of its recommendations DONALD BISHOP 79

Problems in using external information services—attitudes of the special library and its users L. CORBETT 96

UNISIST: a forum SCOTT ADAMS, JOHN GRAY, HERBERT COBLANS and F. W. MATTHEWS 111

The theoretical foundation of the IDC-system: six postulates for information retrieval. ROBERT FUGMANN 123

ASLIB · 3 BELGRAVE SQUARE · LONDON SW1

Aslib Proc. vol. 24 no. 2 pp. 69-149 London, February 1972

Claude Gill Books

a five star service to management

★ **Management and Training Centre**
A unique centre displaying over 10,000 titles on all aspects of management. Managers will find its comprehensive coverage meets all their needs.

★ **Mail Order Supply**
An efficient mail order section supplying books by post to customers throughout the world. Expert staff quickly trace current or out-of-print works, whatever the source.

★ **Worldwide Journal Subscriptions**
You can place a subscription with Claude Gill Subscriptions Ltd. for any journal, in any language, published anywhere in the world. Free renewal reminder service avoids interruption of supply.

H.M.S.O. Publications ★
Government reports, bulletins and other publications available direct to visitors or mail order customers from a government publications department located within the Claude Gill showrooms.

'New Books' Bulletins ★
Regular customers receive the monthly Claude Gill 'Management Newsletter' or 'Science Bulletin'. Listing and describing the most important new books and journals as they appear, these bulletins enable customers to keep up-to-date with latest developments.

Simply write to us if you would like to receive these bulletins for a 3 month trial period.

Claude Gill Books
Management & Training Centre, 481 Oxford St., London W1R 2AQ

Aslib Proceedings

incorporating Aslib Information

VOLUME 24 **FEBRUARY 1972** **NUMBER 2**

© 1972 Aslib and contributors

Aslib Proceedings: incorporating Aslib Information *is published monthly and supplied free to members of Aslib. Subscription rates are £10 annually to non-members, or £2.50 to Aslib members requiring additional copies. Single copies £1 or 25p to members.*

Further information about Aslib's services and membership rates will be supplied on application to the Director, Aslib, 3 Belgrave Square, London SW1X 8PL. Tel. 01-235 5050. Telex 23667; answer-back, Aslib London.

ASLIB CALENDAR 1972

March

THU.2.	Audio Visual Group Annual General Meeting. Aslib. 5.30 p.m.
	Midlands Branch, East Midlands section: Symposium on 'Using regional and local government information services'. Trent Polytechnic, Nottingham.
SAT.4–SUN.5.	Social Sciences Group Annual Conference: 'The British Library and the social sciences'. Bath.
WED.8.	Economic and Business Information Group meeting: 'Is there too much management literature?' Management Book Centre, Claude Gill Books, Oxford St. W1.
MON.13.	Co-ordinate Indexing Group meeting. Aslib. 3.30 p.m.
WED.15.	Aslib evening meeting 'Oh! Typography' by Charles Gibbs-Smith (Emeritus Keeper, Victoria and Albert Museum). Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1. 5 for 5.30 p.m.
	Midlands Branch and Midlands Regional Liaison Office one-day course: 'Financial and commercial information'. Chamber of Commerce, Harborne Road, Edgbaston, Birmingham.
FRI.17.	Scottish Branch Annual General Meeting and Conference: 'Library Management'. West Park Hall, University of Dundee.
THU.23.	Midlands Branch Annual General Meeting and buffet. Engineering and Building Centre, Birmingham.

April

THU.6.	Aslib visit to NRLSI, Bayswater Division, W2. 4.30 p.m.
SUN.9–WED.12.	Chemical Group courses: 'Introduction to modern methods of chemical characterization', Kingston Polytechnic, Kingston-upon-Thames; 'Nature and language of chemistry', Courland Grove Hall, London SW8.

Calendar (*Cont.*)

WED.12–FRI.14.	Co-ordinate Indexing Group Annual General Meeting and Conference: 'Words and meanings: the whole problem of the thesaurus for co-ordinate indexing'. Churchill College, Cambridge.
TUE.18.	Midlands Branch evening meeting: 'Current awareness—cost and effectiveness', by A. E. Cawkell. Arden Hotel, Birmingham. 6.15 p.m.
WED.19.	Aslib evening meeting: 'Information analysis', by Dr P. Leggate (Oxford University). Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1.
TUE.25.	Aslib one-day study session on Europe: 'A guide to economic and business information for the EEC'. Royal Institution of Naval Architects, 10 Upper Belgrave St, SW1.

May

WED.3.	Computer Information Group evening meeting. Aslib. 5 for 5.30 p.m.
THU.4–SAT.6.	Northern/Midlands Branch joint conference: 'Services to the information unit.' Derwentwater Hotel, Portinscale, Keswick.
WED.10.	Aslib evening meeting. Speaker: Richard Orr (Director, Institute for Advancement of Medical Communication, USA). Royal Institution of Naval Architects, 10 Upper Belgrave St, SW1.
	Midlands Branch, East Midlands section: Forum on Trade Literature. British Rail, Derby.
TUE.16.	Midlands Branch visit to *Birmingham Post and Mail* offices.

June

WED.14.	Aslib Annual General Meeting.
	Sixth Aslib Annual Lecture by Professor B. J. Mason, FRS. Royal Aeronautical Society, 4 Hamilton Place, W1.
FRI.16–SUN.18	Electronics Group 14th annual conference. Civil Service Staff College, Ascot.
WED.21.	Aslib one-day symposium: 'Tomorrow's information worker—education and training.' Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1.

ASLIB INFORMATION

Oh! Typography

The speaker at the Aslib evening meeting, to be held on Wednesday, 15th March, 1972, will be Mr Charles Gibbs-Smith, Keeper Emeritus, Victoria and Albert Museum, who will take a provocative look at recent trends in typography.

In Mr Gibbs-Smith's view, one of the major curses of modern life is the typographer. He used to be our cherished servant; he has become our tyrannical master. His is a new breed today, bent on maiming human communication, whose aesthetic ideal is the blank white page, or at best, a minuscule arrangement of type composed of one letter repeated all over, for harmony's sake. In pursuit of heaven knows what arcane goal, the modern typographer throws punctuation down the drain, banishes capital letters and dragoons words and figures into incomprehensible design units. He has become the dedicated enemy—says Mr Gibbs-Smith—of clarity, legibility and sanity; and must, if we are to preserve our reason, be sent collectively to the scaffold without delay.

The meeting will be held at the Royal Institution of Naval Architects, 10 Upper Belgrave Street, London SW1, and will be chaired by Mr J. L. Howgego, Keeper of Prints and Pictures at London's Guildhall Library. It will begin at 5.30 p.m. (tea 5 p.m.).

External information services: the users' view at Sheffield

Programme planning for Aslib's 46th Annual Conference, to be held at the University of Sheffield from 24th–27th September, is well advanced. Speakers have been secured and the initial response from participants in the proposed exhibition of commercial information services is encouraging.

A particularly interesting session will be that on Tuesday, 26th September, at 9.30 a.m., when it is hoped to present case histories recounting individual experiences, happy and otherwise, in using external services. Informally, many members have expressed strong views on this subject: now is the opportunity to air them in public, to share the lessons that can be drawn therefrom and consider how the problems raised might be met. Such case histories are needed *now*, so members who would like to contribute are asked to approach the Conference Organizer, Aslib (3 Belgrave Square, London SW1X 8PL) as soon as possible, with a synopsis or draft text.

Economic and business information for the EEC

Industry and commerce in the United Kingdom are faced with the need to prepare for British entry to the European Economic Community. Such preparation must be based not only on the fullest possible knowledge of the Community as it now is but also on an awareness of the likely developments in commercial, economic, industrial and other related fields.

A vast amount of information on these subjects exists; the difficulty is to chart the problem areas and to find some of the sources, in the United Kingdom and in the EEC countries, from which information may be obtained. To meet this need, Aslib is staging, with the co-operation of the Economic and Business

Information Group, a one-day study session on economic and business information for the EEC, which will be held in the Weir Hall of the Royal Institution of Naval Architects, 10 Upper Belgrave Street, London SW1, on Tuesday, 25th April, 1972.

The problem will be briefly stated by Stephen Schattmann, an economist concerned with European industrial and financial affairs, and speakers who will chart the information sources available will include Rudolf Bree, until March this year Director General for the Dissemination of Knowledge with the Commission of the European Economic Community, describing the Community's instrument for information policy and practice; Ronald Mayes of the Department of Trade and Industry covering Government and official sources of information; A. L. Smyth, Commercial Librarian, Manchester Central Library, describing the information facilities provided by banks, trade and professional associations, chambers of commerce and other non-Governmental sources. W. A. F. P. Steiner, Librarian of the University of London Institute for Advanced Legal Studies, will take a look at the chief sources of information on the law of the EEC and on the laws of its member countries and where they can be located, particularly in London. The paper by Ian Maclean, IMAC Research, is principally concerned with information on the size and structure of the market and discusses how much of this information is available in the UK and where, and what, are the principal sources in the EEC countries. In his paper, George Henderson, CBD Research, will compare company information sources in Great Britain and the Six and describe some key European source material. This tightly packed programme aims to provide a serious learning occasion and ends with a question and answer session in which all the speakers will take part.

For further details, and a programme with form of application, contact the Conference Organizer, Aslib, 3 Belgrave Square, London, SW1X 8PL.

Social Sciences Group

The initial interest and enthusiasm for the Group and its activities have been maintained, indicating the need within Aslib for a forum wherein information and librarianship in the social sciences can be studied. Open evening meetings have included papers given by Dr N. M. Bradburn, Director of the National Opinion Research Center, Chicago, on the concept of data libraries and the problems of social science data; Mr M. B. Line on the findings of INFROSS, the OSTI-supported investigation into information requirements of the social sciences; Professor W. L. Saunders, Director of the Sheffield University Postgraduate School of Librarianship and Information Science, on the findings of the Sheffield Language Barrier Report and INFROSS from the point of view of the implications for social scientists; and Mr J. E. Pemberton on the more important findings of his research for the SSRC on the national provision of printed ephemera in the social sciences, which arose out of recommendations made by the Group in 1970 on primary materials in the social sciences.

A working party (now representing the Group, the Library Association and DISISS) concerned with the information needs of social workers has produced a mock-up of a current awareness service, 'SWIFT: Social Work Information for Today', as a result of their deliberations as to the type of service required by social workers. This has been circulated to selected persons to discover its likely usefulness to social workers, the next step being to evaluate the economic possibilities of such a service.

Group membership is now 111, comprising 1 national library, 38 university and college libraries, 18 societies and institutions, 1 county library, 11 government department libraries, 23 firms, and 19 personal members. Membership includes 11 organizations outside the United Kingdom.

Using regional and local government information services

The East Midlands sub-section of the Aslib Midlands Branch are holding a Symposium on 'Using regional and local government information services' at the Trent Polytechnic, Nottingham, on 2nd March 1972. Speakers will include: R. Brearley (Assistant Director, Publications Division, HMSO); G. V. Dyke (DTI, Interlab.); P. Ellis (ILO, Trent Polytechnic); and M. Stacey (NANTIS, Nottingham Public Library). The fee is £1.75 which includes buffet lunch, coffee and tea.

The East Midlands section are also organizing a forum on Trade Literature to be held at British Rail, Derby, on 10th May 1972. Further details about both these meetings may be obtained from Mr D. P. Woodworth, Loughborough Technical College, Radmoor, Loughborough, Leicestershire.

New Year Honours

Librarianship received some welcome recognition in the New Year Honours List. Among recipients of the MBE were Miss N. E. Campbell, Press Librarian, Royal Institute of International Affairs; Miss D. H. Grose, Chief Librarian, Consumers' Association; Mr L. M. Payne, Librarian, Royal College of Physicians; Mr S. Wood, Library Assistant, Royal College of Surgeons; and Mr E. R. Yescombe, Librarian, the Polytechnic of North London.

Also among Aslib's friends who received awards was Dr L. G. Riddell, Director of PIRA.

Seminar on the British Library

A residential seminar, entitled 'The British Library: bibliographical prospects and expectations', has been organized by the Cataloguing and Indexing Group of the Library Association to be held at the University of Edinburgh from Friday, 24th March to Monday, 27th March, 1972.

Speakers at the seminar, who are specialists in the field of their own contribution, have been invited from a wide range of libraries and services, and it is hoped that what they have to say and the subsequent discussion will represent the viewpoints of the profession at large concerning the prospects which could follow the constitution and development of the British Library. The speakers are: A. H. Chaplin (Immediate Past Chairman, CIG); A. van Wesemael (Deputy Librarian, University of Utrecht); K. P. Jones (Librarian, Natural Rubber Producers' Research Association); A. Trebble (Project Investigator, University of Sussex Library); R. Astbury (Lecturer, Liverpool Polytechnic); H. Heaney (Assistant Secretary, SCONUL); Keith Davison (International

Computers Ltd); P. Quigg (Lecturer, Queen's University of Belfast) and H. Coblans (Managing Editor, *Journal of Documentation*).

The papers will be apportioned between current British bibliographical records: monographs, serials, etc., non-book material; currently imported material, antiquarian books and manuscripts; the significance of ADP; and the prospective influence of the Library's bibliographical services on British librarianship generally and their place in universal bibliographical control.

Further information is available from J. C. Downing, c/o BNB, 7 Rathbone Street, London W1P 2AL.

Teaching in information work

The International Conference on Training in Information Work was held in Rome from 15th–19th November 1971, under the auspices of the FID and the Instituto Nazionale dell'Informazione (INI). The conference made some twenty recommendations to the organizing bodies, which included the following:

(1) They urged that governments should support education for information work, and that research in information work should be carried on in teaching institutions.
(2) There should be a common core of education for all types of information workers.
(3) The use of information should be taught to all pupils in schools and students in universities.
(4) Studies of users' needs were to be encouraged, and information on existing schemes for the training of users exchanged.
(5) The importance of language teaching, and of refresher courses for trained information workers were emphasized.
(6) A concordance of equivalences of the various existing qualifications should be drawn up.
(7) Crash courses should be provided for people in charge of information services without qualifications.
(8) The importance of information for management, and of management skills to information workers were both stressed.
(9) Training should emphasize likely future developments in the profession.
(10) The setting up of training facilities for those intending to teach information work was urged—an international institute for this purpose is planned by the FID.
(11) It was important that terminology in information work should be standardized, and available standards in the field should be used in teaching.

Management and information

The Institute of Information Scientists will hold its Fifth Conference at the University of Manchester, Owens Park, from 11th–13th April 1972. With 'Management and Information' as the overall theme of the Conference, there will be sessions on the Information needs of management, Managing the information function, Managing the information unit, and the Future scene. Further details can be obtained from the Conference Secretary, Mr D. F. Styles, 55 Penrhyn Avenue, Middleton, Manchester M24 1FP.

Audio-Visual Workshop and courses at Leeds Polytechnic

The Department of Librarianship, Leeds Polytechnic is organizing an Audio-Visual Workshop for the week 20th–24th March 1972. This residential short course will be of an intensive and practical nature using all of the instructional materials resources of the Department backed up by those of the Polytechnic Educational Technology Unit. Formal lectures will be few and brief, the accent being upon course members obtaining first-hand experience of handling the machinery, making visual aids themselves and discussing problems and possible solutions with specialists who will be in residence. A comprehensive exhibition of the latest multi-media materials will be featured as will a visit to an operational educational television unit. Course fee is £30 including single study bedrooms and all meals (except lunches).

The Department is also offering a series of one day course packages which can be presented 'on-site' either in a library or as a contribution to a course or a meeting. Examples of available packages are 'Searching the technical literature', 'The utilization of periodicals', 'Management by objectives in libraries'. The on-site courses are particularly suitable for in-service training schemes and for meetings of members of local co-operation schemes for training purposes.

Details of both the Audio-Visual Workshop and on-site courses may be had from the Director of Short Courses, Department of Librarianship, Leeds Polytechnic, 28 Park Place, Leeds LS1 2SY.

IEE/AIP agreement on technical information services

The Institution of Electrical Engineers (IEE) and the American Institute of Physics (AIP) recently agreed on joint participation and co-operation in the provision of a comprehensive range of technical information services for the world physics community.

The aim of the agreement is to establish a single, jointly-sponsored, international English-language information system in physics, an aim which was reflected in the recommendations of the recent inter-Governmental UNISIST conference held by Unesco in Paris, where it was proposed that increased co-operation should be generated between information-producing organizations.

According to this agreement, all the information products and services of the two societies in the field of physics, excepting the primary journals published by the AIP, will be regarded as part of the new jointly-sponsored information system. This pooling of resources will offer to the physicist a number of secondary information products at present available from either the IEE or the AIP, including: *Physics Abstracts* (IEE/AIP); INSPEC (IEE/AIP); SPIN (AIP/IEE); *Current Physics Microform* (AIP/IEE); *Current Papers in Physics* (IEE/AIP); *Current Physics Advance Abstracts* (AIP/IEE); and *Current Physics Titles* (AIP/IEE). Also to be made available soon, as a result of this agreement, will be a range of special bibliographies

The National Science Foundation in the US and OSTI in this country have recognized the importance of these services to the physics community and each is giving financial support to the research and development work necessary to the establishment of a complex machine-based system.

Information retrieval using 'character strings'

A mechanized information retrieval system normally relies on matching terms, i.e. whole words or word stems, that occur in both user 'profiles' and in the data base. For this purpose the data base can be organized in several ways; but, since the number of terms in it is variable and can be very large, the cost of retrieval depends greatly on how well it is organized. Initial studies under Dr M. F. Lynch at Sheffield University have led him to suggest that some economies might be gained by the use of 'character strings', i.e. sets of two or more continguous letters and/or numbers, instead of terms. It is possible to choose character strings that occur with the same frequency in document titles (or titles with abstracts) and match their occurrence in the data base and the user profiles. In this way documents may be indexed using a small number of character strings relative to the number of normal indexing terms that would be required.

To investigate the feasibility of this approach OSTI has awarded a grant of £8,900 for an 18 month project at the University. The immediate objectives of the project are to examine the stability of character and character-string frequencies within several data bases and the way in which they change with time. Methods of identifying particular character strings for use as index terms will be developed and tested for different types of file organization. Finally the advantages and disadvantages of the approach will be explored.

Study of hospital library and information services

The Department of Health and Social Security has offered a grant of £15,900 over two years to the Wessex Regional Hospital Board for a study of the use of library and information services by medical and associated workers in the Board's area.

The study will attempt to define the various types of information users in the health sciences, the levels of information required, the purposes for which it is required, the methods of communicating it and the various sources available in the health sciences.

The project will be carried out in co-operation with Southampton University and an advisory committee will be set up with representatives of the Board, the Department, the Medical Research Council, the University and OSTI.

Public libraries research projects

Complementary to the work of OSTI in the field of scientific and technical information is the work of the Libraries Division of the Department of Education and Science in the field of public libraries research. A number of projects are currently in hand, including one on public library buildings which began in May 1971. This project, which is staffed by librarians seconded from local authorities, assisted by personnel from the Architects and Building Branch and Libraries Division, aims to isolate the important factors relevant to the grouping and location of public library services now and in the future, and to assess the effect of these factors on the design of public library buildings.

Other studies soon to be undertaken include an investigation of the use of periodicals in public libraries; a detailed study into the staffing requirements of public libraries (this is part of a manpower forecasting programme for librarianship and information work to be undertaken jointly by Libraries Division and OSTI); and an investigation into the scope for co-operation at local level between libraries of different kinds.

OSTI postgraduate awards

The first OSTI research fellowship and studentships were awarded during 1971. The fellowship was awarded to Dr Robert Clinging, who will study the production of a chemical-reaction index from a computer-based reaction analysis and retrieval system at the Postgraduate School of Librarianship and Information Science, Sheffield University. Five studentships were awarded, two at Sheffield University (for research respectively on the 'image' of librarianship and information science, and on the use of screens for searching chemical structures), one at Loughborough University of Technology (to evaluate the provision of, and needs for, information services in the East Midlands Region), one at Newcastle upon Tyne University (to study the organization and manipulation of large files of bibliographical data) and one at Aston University, Birmingham, as part of its interdisciplinary higher degrees scheme (to investigate an on-line system for technical and management information in an industrial firm).

Polish Central Institute of Scientific, Technical and Economic Information

As a result of organizational modifications, which have been introduced into the structure of the major organisms for scientific technical and economic information in Poland, the Polish Central Institute of Scientific, Technical and Economic Information has been replaced by two new organizational units: The Centre of Scientific, Technical and Economic Information (CINTE); and the Institute of Scientific, Technical and Economic Information (IINTE).

The scope of activities of CINTE includes problems of programming planning, co-ordination and control of the development of the national information system, and the representation abroad of Polish scientific, technical and economic information, as well as collaboration with foreign information centres and associations. The functions of the Institutute of Scientific, Technical and Economic Information (IINTE) include organizing and realizing research work in the field of information, in realizing standardization activities in this same field and in ensuring the training and education of information personnel and information users.

BRIEF REVIEWS

CANNING HOUSE LIBRARY. Portuguese and Spanish Dictionaries, 1971. London: Hispanic Council, 1971. 22 pp. 30p.

This select list of Portuguese and Spanish dictionaries, compiled by Canning House Library for the use of member firms, technical translators and the general public, has a broad alphabetical subject arrangement within each language group. Bi-lingual and multi-lingual dictionaries are included, and items considered to be 'of special general utility' are indicated. One of the virtues of this list is that items in it are available for consultation at the Hispanic Council Headquarters in Belgrave Square, where the library also undertakes to give advice to enquirers with specialized needs. From time to time the Information Department at Aslib is asked for lists of specialized dictionaries in various languages, and welcomes this list.

DEUTSCHE FORSCHUNGSBERICHTE (German Research Reports), No. 1, Hannover: Technische Informationsbibliothek, 1971. 104 pp. Free.

The first edition of Deutsche Forschungsberichte has been published by Technische Informationsbibliothek, Hannover. This bibliography is rather similar to the *NLL Announcement Bulletin*. Listed are German research reports published in the Federal Republic of Germany and received by TIB, Hannover. Excluded are doctoral dissertations and publications available through the book trade.

The subjects covered are science and technology in general, except the following: astronomy, geosciences, mining and mining engineering, aeronautics and astronautics, atomic energy, plasma physics, biology, and agriculture. The first issue lists about one thousand reports received since 1965. Though this first issue does not contain an index, indexes are promised for subsequent issues.

The list is available free of charge to qualified libraries from Technische Informationsbibliothek, Abteilung Deutsche Forschungsberichte, D-3 Hannover, Welfengarten 1B, Fed. Rep. Germany.

Information flow in the construction industry: a study and the development of its recommendations

Donald Bishop

Director of Management Services,
Department of the Environment

Paper presented at the 45th Aslib Annual Conference, Darmstadt, West Germany, 10th–14th October 1971

TWO FACTORS combined in the United Kingdom to make improved communications a more important subject than had been the case previously. On the one hand the building industry is fragmented, in that design and construction are usually undertaken separately, the former by firms of professional architects, quantity surveyors and engineers usually working independently, the latter by contractors supported by a large number of specialist sub-contractors. Conventionally, the design professions produce a complete and fully detailed design supported by specifications and bills of quantities, although usually some details are available only after work on site has commenced. On the basis of these documents contractors tender competitively, most contractors undertaking only a proportion of the total work, the remainder being undertaken by specialist sub-contractors, some of whom are appointed directly by the client and others who work directly to the main contractors. Hence, at the tender stage in particular, there is need for clear and complete information. Additionally during design and construction there is a continuing requirement for information to be passed quickly and reliably between organizations. The basic system (Figure 1) only hints at the number of organizations involved in design and construction and the complex flow of information. Hence the importance, and growing importance, of a reliable, universal and efficient flow of information.

The second factor is increased costs. Common with many other countries building costs have risen gradually throughout the years, and rather more rapidly recently. Significantly, however, building costs have risen less rapidly than the cost of labour either on site or in design offices (Figure 2). The income for design offices is usually a fee based on the cost of construction: therefore income has risen less rapidly than salaries, the principal component of the cost of a design office. Since the majority of design tasks involves receiving information, analysing it, and preparing information for others to use, any improvement that cheapens information handling would be of great benefit to designers. Perhaps for this reason design offices and professional institutions representing

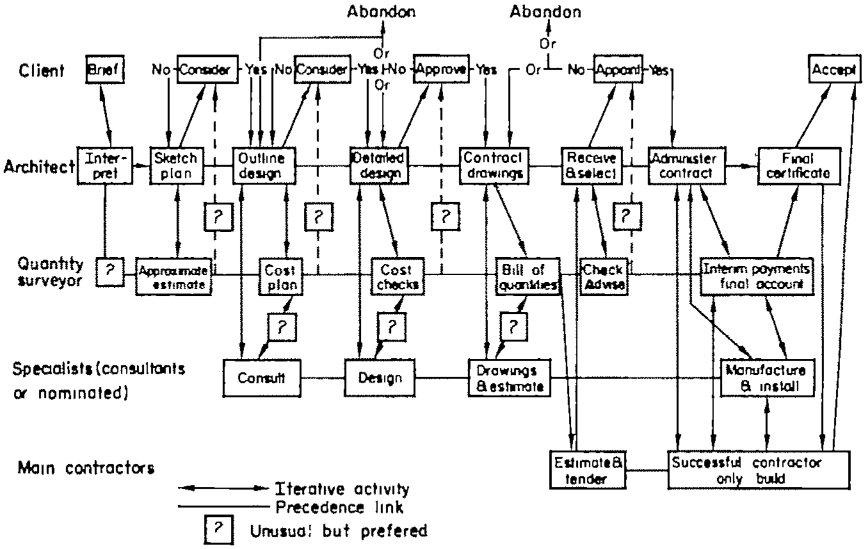


FIG. 1: *Idealized procedure (from professional standpoint)*

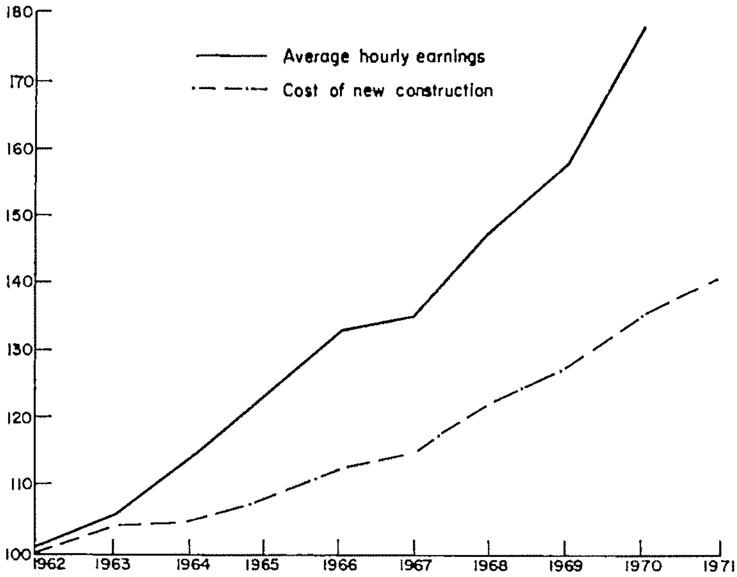


FIG. 2: *Increases in construction costs and hourly earnings* (Monthly bulletin of construction statistics)

designers have been active in developing ways of improving information flow, with or without the use of computers. Similarly, lack of information leads to uncertainty and delay on site and perhaps to materials being mis-ordered. Hence contractors also have an interest in improving information systems and making them more reliable.

This paper takes as its starting point the study of coding and data co-ordination by the Building Research Station (UK) made at the request of the Committee on the Application of Computers in the Construction Industry (CACCI) appointed by the then Minister of Public Building and Works. A Sub-Committee (Chairman, Alex Gordon, OBE, FRIBA) was appointed to oversee the Study Team which reported at the beginning of 1969.[1] This Report has been examined and developed by a Working Party of the Minister's National Consultative Council and a Report of this further work was made available to the industry at the end of 1971.[2]

The first point to emphasize is that the subject is essentially practical and here-and-now. A more apt title for the report would have been 'Information flow in the construction industry'. To be useful, information must pass from one to another by some medium, for example a printed page, a drawing, a computer tape or verbally. Data co-ordination attempts no more than to ensure that whatever the medium, information required for the industry's business is economic and convenient to all. Although stemming from an initiative by a Committee primarily concerned with computer applications, many of the advantages can be obtained without using computers, but some only if the majority of users follow the same practice.

The study concentrated on the various functions that are performed during the building process (irrespective of who performs them) and, in particular, the information needed, the information that results, and the functions from which and to which this information passes. The study showed that there are certain basic items of information that are of concern to all participants in building, and that all participants need access to data from past projects; as well as to general information such as building regulations, codes, standards, design criteria, etc.

To be more specific, all participants need access to the client's brief as it develops and to statements of any constraints from which they must work. In fact it is not too much to assert that good projects start with good briefs. All participants need to know—and to contribute to—the latest 'state of play'. To do this they need to know the form of the building—information that starts in a tentative and imprecise way and is progressively made more and more precise as design proceeds. All participants are concerned with the resources employed in building; materials, human and equipment. They all need ways of identifying and classifying resources economically and unambiguously. Finally, all participants need to draw on experience from past jobs and on information private to their own organization, in order to be able to allocate resources and to estimate costs.

One central conclusion of the BRS Study was that it is neither possible, nor necessary, nor desirable to develop a single, comprehensive system of data co-ordination purporting to serve all the functions presently discharged by the construction industry. The size and diversity of the industry, on the one hand, and the changes occurring within it, on the other, dictate a 'continuous creation' rather than a 'big bang' approach to data co-ordination. Hence the Report argued that a framework should be established to support a number, and possibly a large number, of related systems serving the needs of the industry. Because of advantages foreseen, and because of the enthusiasm of individuals, it is natural that progress in some sectors will be quicker than others; also, it is inevitable that some developments will prosper and others will flounder. Hence the framework must be hospitable to systems serving specialized and limited ends, and so structured that the demise of a system does not damage the framework as a whole.

The Report identified criteria which, taken together, should enable potential users to identify quickly the range of applications of any system of data co-ordination and coding and to assess its practical and technical consequences. The Report also proposed a framework within which individual systems could be developed in a way that would ensure sufficient compatibility in future, and gave an example of a code which would meet the requirements of criteria and the framework. Finally, the Report suggested that a central organization should be established in order to advise those embarking on the development of systems of data co-ordination, to act as a central clearing point for information, and to engender sufficient co-ordination to produce an orderly approach to this subject.

Study method

At the outset the intention was to study, by observation, the flow of information between individuals and organizations in order to distinguish the various sources and recipients, the content of the information sought and received, and the relevance and usefulness of the various vehicles in differing circumstances. Practical considerations prevented this course from being followed; the scale of the industry, the numerous arrangements of designers, specialists, main contractors and sub-contractors would have demanded an impossible number of separate case studies. Extensive case studies, even if practicable, would have shown only the variety that existed in the industry—a factor already well known.

Attention was therefore focused on the functions discharged, each function being the achievement of an identifiable goal. That is, the study was no longer concerned with the roles fulfilled by particular groups of people; with who does what. The model assumed was simple. Every building project was assumed to be discharged by the execution of functions, each marking the achievement of an identifiable goal (Figure 3): a different project will entail some functions common to the first project and some new ones (B) and so on for other projects (C).

Functions were defined as being discharged by a procedure, where a procedure is a number of operations applied to a set of data. For example, the procedure 'establish temporary bench marks' involves transferring survey data to setting out pegs, by the measurement of angles and distances, a task that could be described by an explicit set of instructions called a routine. Similarly, the procedure 'calculate heat losses' involves manipulating information about the form

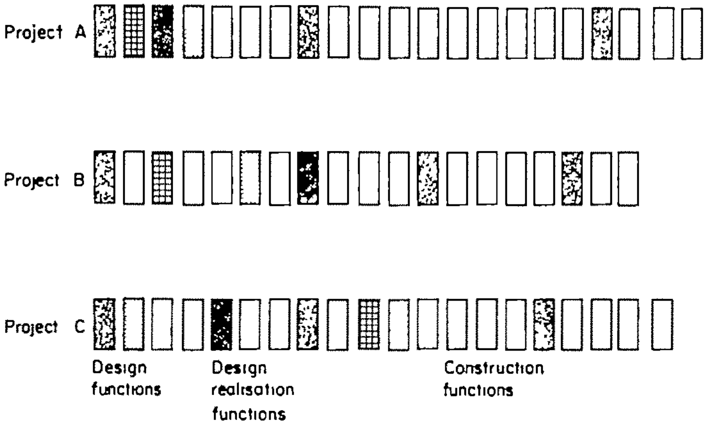


FIG. 3: *Projects are discharged by the execution of the relevant set of functions ('jobs to be done')*

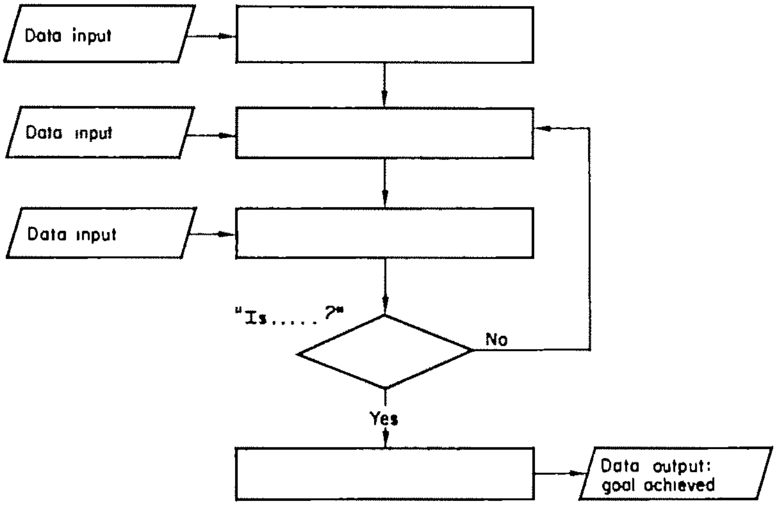


FIG. 4. *A function can be discharged by a series of operations which can be stated as* A PROCEDURE = OPERATIONS APPLIED TO A SET OF DATA

of a project, the form and properties of the external envelope, and about the internal and external environment, by a number of discrete steps, again a routine.

It was convenient for routines to be represented by flow diagrams similar to those used in computer programming. It is sufficient to note that the process, as interpreted on the diagram, proceeds by single steps that are either operations or decisions, that some of the operations might be described in greater detail in another related routine, and that iterative loops are allowed.

A procedure may entail only one operation applied to a set of data. More often, however, there are a number of operations which have to be, or can be, carried out in a given sequence. The description of the operations in their sequence is termed a routine. Hence procedures are sets of data as input (S) and output (S) operated on by routines (Figure 4).

A distinction is made between project data on the one hand and information to be retrieved from general sources on the other. By project data is meant the data that develops with a project and is specific to it, starting with a statement of client's requirements and concluding with the appraisal of a way in which these requirements have been met. During this process reference must be made to the sources of more general information, not specifically related to the project under consideration. Some of this may be acquired by way of feedback from previous projects, e.g. information recording past performance and costs. The majority will be drawn from catalogues of products etc., from regulations or standards, or from the conspectus of knowledge available to the industry, the latter material likely to be found in libraries.

Much of the study was taken up by the preparation and validation of procedures typical of building design and the management of construction. This work served to validate the models assumed, to identify the roles played by information during building processes, and the points at which some measure of data co-ordination could be expected to produce beneficial results, either by leading to a better use of information already available, or to more economical working, or both.

In order to accomplish this, the Team divided into sections, each of which developed procedures, including routines and information schedules, often in consultation with practitioners, and subjected them to scrutiny through extended interviews with practitioners. The purpose of these interviews was to ascertain whether the procedures developed could be applied in practice, whether the information set out in the schedules identified information actually sought, and what were the usual sources and vehicles of information.

Reports were prepared covering the sectors studied, i.e. architectural, design, structural design, mechanical and electrical services, quantity surveying, products manufacture and merchanting, and construction. These field trials validated the general model and the flow diagrams and information schedules required which were then analysed.

In a conference paper it is not possible to deal with the detailed examination of each of the sectors which are summarized in the main Report and are examined in detail in a number of supplementary Reports, produced as Current Papers by the Building Research Station.[3] For the purposes of this conference paper it should be sufficient to identify the role of the information system and the main recommendations of the Report. It is important to emphasize, however, that these were not conjured out of the air; they were derived from a detailed examination of the way the industry works and the information is required.

The purposes of an information system for the building process

The general picture derived was not one of lots of types of information whizzing between participants, but of a few basic types, of interest to all, and of the major need to consult previous experience (mostly data about projects) and other non-project information.

The first major type of information at the design stage is the client's brief—the statement on which, when fully developed, the whole design rests, if it clearly defines the client's requirements by stating the performance expected of the project, and the restraints on the freedom of designers (planning constraints, features important to the clients, costs, timing).

The second major type of information passing between most participants is the form the building or its parts will take: the shape, dimensions, sections, room sizes and so on. This information starts in a tentative and imprecise form that is progressively made more precise throughout the design stage. All participants need to know the latest state of the information as the design proceeds, and design optimization would be greatly helped if this were possible.

The third type of information is related to resources; human, commodities, materials, products, components and plant. All participants need to identify (that is, attach a label to) and specify (that is, describe in detail) resources and to assure themselves that the performance of the resources selected matches the requirements.

Most participants in the design process are working within certain general constraints (planning conditions, building regulations, working rules, statutory requirements, etc.) and are making considerable use of past experience and past jobs. There is a major requirement for easy retrieval of relevant past work, of constraints imposed by regulations and the like, and of the results of research in a form that is related to the stage reached in the project.

From these bases the Report derived two sets of criteria; the one dealing with practical and technical considerations, the other with the roles an information system must fulfil.

Practical and technical considerations

The first practical consideration is that an information system must be capable of being implemented in stages. The decisive argument for a 'continuous creation' rather than a 'big bang' approach to data co-ordination is provided by the size and variety of the industry and by its continuing evolution. Each sector of the industry calls for a different, although related, solution, and it is reasonable to suppose that practitioners will be most inclined to take the initiative if they are not constrained by an overriding necessity to await the developments of a unique system that may not meet their particular requirements, or is uncertain in its timing.

The second requirement, following immediately from the first, is that systems must be capable of being hospitable to separate but related sub-systems. In this way, individual organizations or sectors of the industry could develop systems relevant to their own needs in the knowledge that these systems will be compatible with others.

Implementation in stages will entail the encouragement and co-ordination of the separate activities of groups within the industry. It will also require advice, provision of information and an effective forum for agreeing principles and for resolving disputes. That is, data co-ordination is more than a mere ordering of words and the classification of things and concepts. Broadly it stems from the way in which the industry goes about its work. Because of this the industry must be closely associated with and be part of implementations.

Because data co-ordination is so much a part of the industry, information systems must not cloud the responsibilities of the participants. This is likely to be particularly important at the design stage where responsibility for each specialism must rest with a competent organization or individual. Similarly, if contractors are provided with information grouped in ways convenient to them, the selection must not pre-empt a contractor's decision about deployment of resources or selection of a method of construction. Similarly, any fully integrated system, involving the joint use of data files must preserve the privacy of individual organizations. This latter topic is likely to pose some particularly knotty problems and, perhaps fortunately, joint use of files is not an immediate prospect.

Another practical criterion is the need to make an information system acceptable and attractive to the people who are going to have to use it. It is important, therefore, for systems to be matched to the work that has to be done and not to be imposed by dictate. Moreover, proper training must precede the introduction of the system so that those who are to use it are familiar with its peculiarities and are able to use it efficiently. All large system users know from bitter experience the high cost of incorrect data.

Performance criteria for an information system

The analysis of the procedures showed that an information system must:

1. *Classify information* in sufficient categories for users' needs, and in particular to allow data to be retrieved in order:
   (a) to search through data about building types, functional systems, technical solutions, building elements, constructional methods, resources (commodities, materials, occupational groups, equipment);
   (b) to select functional systems, technical solutions, arrangement, construction methods, and resources with regard to performance, specification, availability and cost;
   (c) to check compliance with constraints and with regulations;
   (d) to support feedback within and between projects.

2. *Identify and describe resources*
   (a) to identify commodities (materials, products and components embodied in

construction, contractors' materials, consumable stores), equipment (plant and tools) and occupational groups, in a way that will be convenient for the industry's transactions;
(b) to provide the means by which unique identifications can be assigned to commodities, etc. This should not involve long delays whilst identifiers are allocated and should be cheap to administer;
(c) to produce comprehensive central files for commodities, contractors' materials, consumable stores and equipment files. This would require appropriate classification, agreed sets of properties for each commodity and resource, and a preferred vocabulary, and the means to achieve them.

3. *Describe projects*
(a) to describe form by co-ordinates or other method;
(b) to describe the technical solutions by describing work-pieces, identifying or specifying commodities comprising work-pieces, indicating the circumstances in which the work-piece will be completed, locating work-pieces within projects, and stating restraints to be observed;
(c) to describe operational methods by identifying the construction method, defining activities, specifying the resources to be employed, depicting the sequencing and timing of the resources, resource scheduling, and progress reports and costings.

4. *Foster the development of procedures*
(a) to provide categories necessary for data retrieval in ways to suit the needs of various users;
(b) to enable documents (drawings, schedules, specifications, bills of quantities, programmes, project proposals, resource schedules), to be arranged in ways convenient to users;
(c) to provide the means of co-ordinating conventions evolved for specialist procedures or groups of procedures, a task that includes the development, revision and extension of a preferred vocabulary;
(d) to provide the means to prepare suites of related procedures.

5. *Support information flow*
(a) to identify, for various users, the ways in which information should be structured in order to meet their requirements and to avoid interpretation into another form;
(b) to establish a structuring for the documents used in the industry;
(c) to identify the categories of information relevant to each document;
(d) to provide cross-referencing between documents;
(e) to establish a framework for accepting, identifying and categorizing standard details, and specification preliminary and preamble clauses;
(f) to provide the means of co-ordinating such standardization;
(g) to provide the means of making methods that allow the multiple use of data known and adopted.

A framework

Accepting the necessity for evolutionary development and on the basis of the performance criteria, the Report proposed a framework within which systems related to the industry's needs could be developed. The framework was:

A preferred vocabulary

This would be composed of the descriptors used in the other components of the framework. Words drawn from the preferred vocabulary would form classification categories and appear in conventions and libraries for bills of quantities. It may be necessary to expand the vocabulary to include words used in procedures, although this may not be immediately necessary if procedures are always used to one group of specialists, who would know their own terms of art.

Classification

No member of the Study Team was a classificationist. This may seem surprising to the present Conference, but the intention was to have a performance specification for an information system derived from the needs of an industry rather than a system as such. Hence the study team was drawn from those with a building industry background, or experience of operational research in that context. The Team appreciated, of course, that specialists would have to design systems to meet the performance specification, and that then classificationists would play an important part. For these reasons no attempt was made in the report to discuss classification theories because the team was not competent to do so, although they were greatly influenced by the writings of Mr B. C. Vickery, Assistant Director (Research) of Aslib. The Report accepted a faceted and post co-ordinated approach to classification.

The requirements of an information system to serve the building process are more diverse than the majority of systems of data retrieval, because it must be capable of serving the many technical and subjective procedures met in design, design realization and construction. The severity of this problem is reduced by the model already adopted and by the growing facility provided by computers for rapid access to data and for rapid resortations. The former avoids the necessity of using the system of classification to provide information about priorities or sequences (the shelf arrangement problem) since this is an essential part of each routine and its associated flow diagram. The latter makes possible the use, without inconvenience, of a faceted classification that can be arranged in the citation order appropriate to a particular procedure or group of procedures.

To quote Vickery: 'The ultimate test of the value of relations in classification must be pragmatic, the good relations will be those that earn their keep in retrieval.' Hence, although the study has identified a possible role for many facets, which could be attached to data for filing and data retrieval, it is not imagined that any participant or group of participants would find more than a few relevant. One task during implementation will be to match the facets to the requirements of different users, and perhaps make provision for alternative citation orders. These would indicate the relative priority for determining the content of facets, and whom should be consulted. The facets distinguished are discussed in detail in the Report; they are:

Building type; Functional space and system; Building element;
Technical solution; Commodity classification; Construction method;
Work section; Work element; Operative occupation; Plant and equipment.

Subsequently, a further and more detailed study of classification has been carried out by a team under Professor Leonard Fletcher, assisted by Alan Gilchrist from Aslib. That work is discussed below.

Conventions

Conventions are codification of practice for convenience and better communication. The industry already uses many conventions. Some are widely observed: for example, conventions for the measurement of building and civil engineering work, and for design of reinforced concrete structures; some have comparatively limited currency: for example, the convention for dimensioning and sizing of reinforcing bars, or the British Standard for Drawing Office Practice. Codification of conventions is an essential part of coding and data co-ordination.

Conventions for feedback and performance data indicate the physical characteristics of projects. That is, they indicate a building type, a functional system (a circulation system or drainage system, for example) or building element, together with those aspects of performance that are relevant. Others identify critical performance characteristics or physical characteristics, materials, components, or buildings.

Many conventions are required for technical purposes, including those for sizing buildings and components, for the control of tolerances, and for almost every technical activity, including surveying, environmental engineering, building design and management. Many of these are highly technical and their use confined to one specialism. Nevertheless it is important for both training and for practice that a uniform set of conventions are derived, otherwise every textbook, every set of calculations, entails learning a new unique group of conventions.

Finally there are conventions for production information; that is, conventions for drawings, specifications, and bills of quantities. These are important in that it is this information that is transferred from the design to construction organizations and for this reason the information should be concisely and unambiguously presented.

A central commodity file

One important element of the framework was that steps should be taken to establish a central commodity file which would include a unique code (an identifier) for each commodity, a classification system based on the commodity's principal attributes and performance, and lists of the physical properties, performance characteristics, and commercial information relevant to the commodity and of interest to manufacturers and suppliers, in addition to members of the building team. In this way the commodity file would include all the information now scattered in catalogues, design guides, and papers dealing with purchasing and delivery. Such a file could be used in several ways, but it is envisaged that eventually the crucial information about commodities may be held on a computer in a consolidated central file, although reference to the detailed material might be made by, for example, micofiche cards held locally.

Clearly the compilation of the file will be a major undertaking, although all the detailed information already exists, scattered throughout the various catalogues, information sheets, production schedules, stock lists, etc., used throughout the industry. Nor is it necessary that everything should be done at once. Progress has been made by devising a system to allocate a non-significant number to identify materials and commodities (a commodity classification code) and by preparing a draft British Standard for the presentation of information by manufacturers and suppliers.

Procedures

Much of the study centred around the development of outline procedures, in which information is received, processed and put out, and it is believed that suites of related procedures could make an important contribution to the efficiency of the industry.

For example, procedures have already been developed for preparing bills of quantities by computers, and steps are in hand to provide facilities useful to contractors for estimating, planning and site management. Also, the Working Party on Computer Programs in Structural Engineering (a sister committee to the Committee on Coding and Data Co-ordination) reviewed structural engineering programs and prepared a specification for a suite of programs capable of dealing with commonly occurring structural engineering problems. This suite, called GENESYS (Generalized System for Structural Engineering), has aroused considerable international interest and support. Similar initiatives are occurring in other sectors, architectural design, environmental engineering, and contracting and sub-contracting. The National-Computing Centre, the Department of Trade and Industry and computer manufacturers are all anxious to contribute to this work because of proliferation of procedures and their related computer programs since these are recognized as an impediment to computer applications and a waste of skilled resources.

Assigned codes

Not all data co-ordination requires a universal code; many aspects require no code, many can use arbitrary and *ad hoc* codes, and some will benefit from the universal code. When data is passed between participants, coding can be expected to confirm advantages, because both the generators and the users of the information can adopt common procedures and present data in a way that is immediately useful to recipients. Hence, in the first instance at least, there might be merit in limiting the use of an 'industry' code to those procedures that are industry-wide, because codes designed to serve specific rather than general purposes are likely to be more efficient and compact.

Manufacturers, suppliers, contractors, and sub-contractors, as well as designers, all require specific information about the performance, price and availability of materials commodities which must be uniquely identified. A number is more efficient than words for identification purposes because a description must be complete and specific. The Report argued that an identification code for building materials and commodities should be given high priority. Subsequently, the Working Party responding to a request by members representing merchants set by a Study Team which recommended a form of identity.

Development of the BRS report

Subsequent to publication, the Report was referred to the Minister's National Consultative Council which set up the Working Party on Data Co-ordination early in 1969, with a remit to report in 1971. The Working Party established priorities for its work in consultation with organizations representing the industry and has examined and developed the recommendation of the Report and is about to report, in turn, to the National Consultative Committee. In principle, its findings endorse the BRS Report, in particular that the further development of the topic should be evolutionary, rather than a single, concerted attempt to produce a once-and-all comprehensive system. The current state of play comprises the remainder of this paper.

A preferred vocabulary

In January 1960 a project to develop a thesaurus was started at Brixton School of Building and at the North-Western Polytechnic School of Librarianship. Initially sponsored by the Construction Industry Research and Information Association (CIRIA), the project team was augmented in May 1969 after support from the then MPBW. A draft Thesaurus was completed in January 1971 which, after comment, will be available for detailed appraisal by selected users, and for development. The Thesaurus has an A-Z index and a classified listing based on a set of facets proposed by Vickery.[4] In the event, the work completed only partially satisfies the need for a preferred vocabulary, the terms of art to be used without possibility of ambiguity. Such a vocabulary is a necessary adjunct to computer operations when these are to be widely employed by organizations of different size, in different sectors of the industry, and in different areas of the country.

Classification categories

A Study Team was set up in July 1969 under Professor Leonard Fletcher (who represented the Royal Institution of Chartered Surveyors on the Working Party) to study this aspect of data co-ordination. As part of their study of the demands made by librarians, trade catalogues, regulations and by project data for classification categories, the team examined twelve existing systems of classification. They concluded that a comprehensive system of related classifications was needed if the industry is to be able to organize its information. Their report, made to the Working Party in July 1970, made recommendations for a framework derived from a set proposed by Vickery (Table 1).[4] The report differentiated between the classification of general concepts common to the industry and those needed to serve the particular processes of different sectors of the industry, fundamental and operational categories respectively (Table 2). The Report is being used as a basis for discussions with sponsors of existing information systems, with the expectation that these can be developed to converge on a common set of classification categories for the industry.

TABLE 1: *Generalized fundamental categories*

- Things, substances, entities
  - Naturally occurring
  - Products
    - Tools
  - Mental constructs
- Their parts
  - Constituents
  - Organs
- Systems of things
- Attributes of things
  - Qualities, properties including
    - Structure
    - Measures
  - Processes, behaviour
- Object of action (patient)
- Relations between things, interactions
  - Effects
  - Reactions
- Operations on things
  - Experimental
  - Mental
- Place condition
- Time

Reproduced by permission from: Vickery, B. C. *Classification and indexing in science*. London: Butterworths, 1959.

TABLE 2: *A framework of fundamental categories for the construction industry*

THINGS *A* CONSTRUCTION WORKS PARTS OF WORKS EQUIPMENT CONSTITUENTS AGENTS USERS ENVIRONMENT	ABSTRACTS *B* PROPERTIES PROCESSES OPERATIONS AND ACTIVITIES
PERVASIVE ABSTRACTS *C* SPACE TIME	*D* PERIPHERAL SUBJECTS

Conventions

(a) *Graphic symbols*: Messrs Robert Matthew, Johnson-Marshall and Partners, architects in private practice, were commissioned to study conventions for production documentation, work that focused on graphic symbols and abbreviations currently used by draughtsmen in all sectors of the industry. MPBW, in consultation with the authorities concerned, has produced an agreed and comprehensive set of symbols that will be published as a British Standard.

(b) *Structuring project information*: A team appointed by the Working Party studied systems of structuring project information including those currently being developed. They proposed a number of field trials to determine which features are important to contractors and to their operatives.

(c) *Standardization of trade literature*: Dargan Bullivant Associates, information consultants in private practice, made recommendations which will provide the basis of a comprehensive British Standard on the presentation of technical information in trade literature for the construction industry.

A central commodity file

Messrs W. S. Atkins and Partners, management consultants, were commissioned in 1969 to survey the need for a central file of data on the performance, availability, price etc., of all materials and components used in the industry. Their report concluded that such a file was needed and have identified the technically feasible and commercially viable alternative forms of a central commodity file.

Procedures

Procedures for computer applications are being examined by the Committee on the Application of Computers in the Construction Industry.

Codes

At the request of the Merchants' Association, the Working Party set up a Study Team on Commodity Identification under the leadership of Mr R. Geary (a director of John Laing Construction Ltd) who represents the NFBTE on the Working Party. The Team's Report, published in July 1970, recommended an eleven-digit code for the identification of commodities used in the industry. The code is compatible with that proposed by the National Computing Centre, for use by all industries in the UK and recently circulated in the form of a draft British Standard.

Costs and benefits of data co-ordination

The costs and benefits of data co-ordination are unlikely to be equally distributed amongst the various sectors of the construction industry. Because their incidence will strongly influence the industry's acceptance of the various elements of the framework, PA Management Consultants Ltd were commissioned to quantify the costs and benefits, indicating the different sectors of the industry to which they will accrue. The general conclusion of this work was that the benefits of data co-ordination will exceed by many times the cost. Both clients and contractors will benefit from improved design and improved production information—the work of the design team. In a competitive industry it is to be expected that all the benefits will finally accrue to the industry's clients, and to the public sector in particular, which is better placed to apply data co-ordination to design. Both costs and benefits will be difficult to trace and it is unlikely that benefits and costs will be in proportion for any organization. For some aspects, costs will fall on one sector of the industry and the benefits will accrue to another—an example of 'distributed benefits', a fact of life in a complex inter-related society.

The Report of the Working Party makes recommendations for the future development of coding and data co-ordination. It distinguishes between the syntax (e.g. preferred vocabulary, classification categories), general information (e.g. codes of practice, regulations, technical articles, commodity information), project information and management information, the latter being private to organizations. It makes proposals for the central co-ordination of the syntax and for a loose association of users to work together to evolve the other components, management information excepted, which is seen as a matter for individual firms.

REFERENCES

1 BISHOP, D. *and* ALSOP, K. A study of coding and data co-ordination for the construction industry. London: HMSO. 1969.
2 An information system for the construction industry: final report of the working party on data co-ordination. London: HMSO, 1971.
3 Current papers CP 4/69 to CP 11/69. Watford: Building Research Station, 1969.
4 VICKERY, B. C. Classification and indexing in science. London: Butterworths, 1959.

DISCUSSION

MR B. A. FORD (CIBA-Geigy (UK) Ltd) asked for an indication of the sources and extent of the financing of the project. Mr Bishop said that the Building Research Station carried out and paid for its own study, at a cost of about £80,000, representing twenty man-years of effort. The working party was sponsored jointly by MPBW at a cost of roughly £150,000. The industry spent considerable sums on this topic in the course of its work.

MR R. G. GROEGER (John Laing R & D Ltd) said that Mr Bishop had told the meeting of the three architects who had got together and produced in a few days an excellent design for housing, using only their own experience and knowledge, without reference to any information systems as such. This prompted him to describe briefly his own experience with the relative usefulness of the technical expert and the information worker and how these skills can be usefully integrated.

The Central Technical Information Service of John Laing operates a system for 'Vetting Specifications'. Experience has clearly shown that many of the failures and difficulties which arise on construction sites can clearly be traced back to lax or even incorrect specification clauses written by the consultant artchitect or engineer. In other words, if the technical troubleshooters of the company had only been asked before the event, the difficulties could have been predicted and avoided. However, a site manager does not generally realize that he has a problem till matters go wrong—and the questions are not asked till it is too late. To prevent such predictable difficulties the Information Service examines specifications as soon as the contract has been signed, i.e. before construction commences.

As part of this process the performance of named products and components is checked against records of routine feedback, previous failures and laboratory tests. This is almost a clerical function in which a simple information system is used. However, it is much more complex to ascertain whether the clauses conform to British Standards, Codes of Practice or acknowledged 'good' techniques. A technical expert can spot errors and flaws in a fraction of the time taken by a librarian, who would have to check each reference laboriously and still probably miss many of the points. The bulk of the vetting service, therefore, consists of appropriate experts reading individual parts of the specification—thus the timber expert looks at the joinery and carpentry details, the paint technologist at the painting clauses, the specialist engineer at tolerances demanded and so on. No general information worker could hope to match this scanning procedure.

Finally, the individual comments of these specialists are linked together with the useful information on named products and components found by the information staff. A single simple letter listing all the dubious clauses of the specification is drawn up and sent to the site manager who can then take appropriate action. In this way the Information Service acts to marry its own information systems with the knowledge and experience of specialists outside the service itself. Information Departments can use this type of technique in almost any industry to widen their impact.

MR BISHOP replied that DoE had the same objectives as John Laing's, and had standard specifications which were supposedly mandatory, but that it was true to say that experience showed enormous variability in specifications.

MR W. HILL (NRLSI) asked whether any positive mechanism for information feedback, particularly of failures and errors, had been built into the Construction Industry's information system.

MR BISHOP replied that as it was not an integrated system, organization of feedback would be extremely difficult. However, in the case of information related to the safety of constructions, the return flow of information was considered to be well organized. Informal communication among experts appeared to be the best means of information exchange.

MR F. C. A. EXON (Computer Centre, University College) enquired whether the Commodity File was sensitive to innovations, and whether it stored information on commodities no longer in use. The reply to both questions was effectively no, not so far. Manufacturers were initially not enthusiastic about supplying information to the File, but it was hoped that this attitude was beginning to break down, as a result of the efforts of the Working Party and of pressures generated by other interested bodies. Development is likely to be slow.

MR T. E. HATTON (Barbour Index) commented that his organization, in the course of developing a similar system, had encountered similar resistances at first, but that they had been able to persuade manufacturers to participate. He added that their experimental system supplying commodity information on-line to a sample of fifteen organizations had been very successful. Getting and updating information accounted for 90 per cent of system cost, and computer retrieval for 10 per cent. They thought the system would be commercially viable if they could get fifty to sixty files on-line.

Problems in using external information services—attitudes of the special library and its users

L. Corbett

Atomic Weapons Research Establishment,
Aldermaston

Paper presented at the 45th Aslib Annual Conference, Darmstadt, West Germany, 10th–14th October 1971

TO THE two aspects of the title—external information and attitudes—I would like to add a qualifying extension, namely, observations of a pragmatic special librarian seeking some necessary development routes from the passing conventional library to the current and future library/information centre concept. I will keep to practical matters and problems of today and not fly into 'futurology' which appears to have become a fashion.

Regarding the word 'users' in the title, I am considering this to cover both library/information staff and research, development and supporting staff—or more simply—staff and customers.

Also I speak of the kind of library I know best which is that of the larger science and technology establishment but note that my views do not necessarily reflect those of my employers. The problems and attitudes considered, however, have much in common with other environments. As generalizations, major differences lie in factors such as volume of use—where it is much higher in the university environment, and time span of interests and literature—where science and technology tend to be short while in the social sciences through to the humanities they get increasingly longer. Probably another difference is size of staff—in industrial and government R and D this is often small, and applications of innovative or advanced techniques suffer from lack of man-hours to implement them, while in the university sphere staffing tends to be more generous and the pace slower. In whatever environment, the professional bent on pursuing the route to the library/information centre concept by applying the newer techniques faces problems of implementation which, added to his normal stock control and administration functions, require a lot of persistence and hard work and a willingness to rethink services and procedures in basic terms, both for the library and his programming and systems support.

Another keyword in the title is 'external', which I consider as literature information or data external to the library/information centre's own stock and staff. The expertise, knowledge and advice of the research and supporting staff in one's own organization could be regarded as 'external', but here I will regard this as an essential part of the stock or resources of the centre itself.

Now let us look at the subject of special library attitudes and external problems under three main headings:

(a) The need to get away from the curator, self-sufficient outlook—we might label this ATTITUDES.
(b) The need for user-oriented stock or resources control and tools—label ACQUISITIONS AND PROCESSING.
(c) The need to use external services for both literature and information needs—label CO-OPERATION.

Through each of these three areas run two vital factors, (1) the importance of exploiting computers and communication techniques, and (2) the crucial nature of the twin pressures of the library world—costs and space.

(a) Attitudes—getting away from the conventional library outlook

While changing times, machines and communications are killing off both the curator type librarian and the self-sufficient literature searcher, it is salutary to heed a warning to the non-librarians in the information field given by Jesse Shera in his recently published essays: 'The behaviour of the conventional librarian is worthy of study by information scientists, for it reflects a body of practice evolved over a long period of time and in many situations has proved highly successful.' Since he is in fact attacking the curator attitude he goes on to quote Abraham Lincoln: 'The dogmas of the quiet past are inadequate to the stormy present. As our case is new so we must think anew and act anew.'

Now what are the pressures that are undermining the conventional library, and how and with what problems do we change our attitudes to alleviate these pressures? First comes the information/paper explosion. In the face of this growth rate of publications and authors, the only viable attitudes must be constant vigilance for quality and selectivity in acquisitions, studied ruthlessness in disposal, increasing use of external loans, photocopies and microtexts, and involvement in co-operation and mechanization. Other aspects are considered later.

The pressure of demand for library services is increasing all the time. Beautiful libraries in the USA, designed to last twenty years, are running out of space in ten. Space and budget pressures demand speedier adoption of the newer attitudes and techniques both by staff and customers. Mental attitudes must move towards emphasis on availability and access rather than acquisition, except in the few cases where practicable microforms are available. Fortunately in the UK we have the unique National Lending Library. By using its services, exercising aggressive stock control, and making maximum, albeit expensive, use of other external services, we should for our kind of environment be able to hold off the space pressure.

On the pressure of costs, recent analyses of prices in the UK show increases around 14 per cent for periodicals, and a staggering 33 per cent for books, between the last half of 1970 and the first of 1971. With the current high birth rate also of new periodicals, and a discernible short life requirement by users for much of both periodical and book stocks, a greater level of selectivity, use-analysis and stock disposal is forced upon us. Such dynamic policies in stock control are very demanding on staff, need much higher levels of knowledge of, and records of, user needs, and are highly dependent on effective national lending and co-operative systems. This budgetary pressure was emphasized back in 1968 in a Long Range Planning Study by Stanford Research Institute stating that it would be necessary to increase budgets by 10 per cent a year just to maintain the existing level of service.

Another factor affecting attitudes is that the library must be made a much more used link in the information transfer system than past studies have shown it to be. This can be achieved by the co-operative efforts of both staff and customers to get away from the library concept as merely a depository of the traditional runs of periodicals and books, a large proportion of which may not be consulted from one year to the next. Selective dissemination of information (SDI) services are very slowly, but increasingly, making for improvements in the customer/library relationship. This is related to, and suggests an area that has aroused some interest recently, namely, that of customer specialization and interests registers. Such guides can greatly improve 'intrapersonal communications', and facilitate the active use of the combined experience and literature assessment capabilities of key staff, not only for interpersonal enquiries but also for new and old literature reviewing in stock management. While such records or practices are not necessarily new to the special librarian, mechanization techniques can greatly improve the old methods.

Great scope exists for accelerating the implementation of computer based systems, not only in these SDI and user interests fields, but through cataloguing, indexing, housekeeping and other procedures. Thus will library and information tend to combine and progress along the route to the library/information centre concept. A recent survey of active mechanized systems in UK libraries shows what a very small proportion are as yet involved in the newer techniques. Mechanization has a very considerable potential for alleviating today's pressures on many of our library procedures. It brings the opportunity to make more effective use of clerical and professional staff by freeing us from repetitious and time-consuming clerical chores and providing techniques to improve our services. The opportunity can, however, only be realized if librarians become more actively involved in introducing such new methods and services as are becoming possible. As Overhage of MIT says in a paper, 'Science libraries: prospects and problems', in *Science*: 'Only through the imaginative assertion of leadership (*in this area*) will the library profession ensure that the coming transition is accomplished without sacrifice of the essential features of past achievements. Computers can give librarians a wholly new freedom in the organisation and control of their materials.' Librarians' knowledgeable involvement in the new techniques combined with their background of experience in literature and its use are also needed to counteract the misguided optimism of those who think modern technology is the only remedy. To quote Overhage again: 'Mechanisation itself, however well conceived and executed, is not enough. New machinery must be accompanied by intellectual efforts directed toward improving the organisation and the quality of the recorded substance in each field of learning.'

In short, all this requires attitudes of greater professionalism geared to increasing (a) our information involvement with customers, (b) our use of machines for information processing and for house-keeping, and (c) the effective use of our clerical and professional staffs.

(b) Acquisitions and processing—dynamic attitudes to resources—user-oriented tools

Stock and records, and means of access to them are considered from viewpoints of suitable stock for effective display, accessing tools, guides and indexes to meet users needs, and developments in mechanization and their impact on access.

Every progressive librarian will admit dissatisfaction with his performance in stock control. It is heavy in its demands on customer and use knowledge, staff time and teamwork (including some physical effort), as well as organization. Some measure of ruthlessness is inevitable, the intensity of discarding increasing with the effectiveness of external borrowing, photocopying, microtexts, or teletransmission services.

Taking periodicals first where customer demand is clearly shown in reference and circulation pressures. Acquisitions have to be linked to considerations of: specific and overall needs of the organization; quality and presentation; and cost-benefit. As costs, and new titles, increase, effective circulations become more difficult. We and our customers have to make greater use of selective dissemination: by computer aided alerting, by current awareness publications like *Current Contents*, and by local and externally obtained bulletins of varying currencies and specializations. By trying to reach our gatekeepers and main project teams by such methods of alerting, multiple copies and heavy circulations can be restrained, especially when there is reliable reference access, rapid external borrowing, and easy photocopying. The photocopying workload can be appreciably helped by providing 'do-it-yourself' facilities.

Mechanized SDI can also reduce the need for multicopy purchasing of *Current Papers* and other special bulletins or abstracts. SDI does of course give an 'on-the-desk' current reading selection tailored to users' main interests with considerable savings in user time and effort. SDI can also reduce pressures for multicopy provision of some of the more expensive classic and voluminous journals. As users' experience and confidence in an SDI service increases they frequently drop their former cover-to-cover scanning of some of their classics such as *Physical Review* and *Journal of the American Chemical Society*.

Now some brief remarks on problems consequent to the local implementation of SDI. I doubt if any wide-subject-range library has yet resolved rational policies for core journal scanning and bulletin production combined with and related to mechanized SDI, and purchased bulletins or publications from specialized centres. Each environment has its particular problems and peculiarities of need, but more and more library/information systems are being obliged to study or experiment in this difficult area, where literature coverage, subject scope, timeliness, measures of annotation, customer education, and considerable ramifications of organization and cost factors, are involved. The beginnings of machine processing collaboration, co-operative processing, and institutional or commercial agency contracting, are arising in some circles here in Europe, and in the USA and Canada.

Mechanized SDI and special bulletins, current awareness tools and abstracts, can influence the need to acquire many current periodicals at all where external loans are effective. As Dr Rowlands suggested in his useful SDI policy paper to the 2nd Cranfield IS and R conference, analyses of operational SDI open up the possibility of reducing a periodicals title holding of a thousand perhaps even by half. Whether using SDI or not, we need to make careful study of circulations and copying records, internal and external loan records, and customer interviewing, to optimize periodicals representation, and useful and desirable shelf life and disposal policies. These are activities all too little indulged in by all of us. Bradford and Brookes have lighted the way in theory, and by offering model and graphical techniques, but as Brookes says in his *JASIS* paper: 'No externally devised scheme can be applied ready-made . . . in work on obsolescence every librarian must carefully consider the totality of needs his library is expected to serve, and then—do his own thing.'

On disposal, we must resist the natural reluctance to put out as waste paper circulation copies of journals which have in fact fully earned their cost by having been seen (and hopefully read) by a number of people. On the other hand, in the sale or disposal of back runs of seemingly little used or non-current journals—which is an attractive and effective way of alleviating space pressures—purely cost-benefit considerations have to be tempered by some subject use and availability knowledge; for example, I might keep the old *Wireless Engineer*, yet be tempted to dispose of long runs of a classic like *Comptes Rendus*.

Such dilemmas would not arise in the curator outlook library, and illustrate the suggestion by John Davies of IBM that the librarian, if unable to throw off the curator attitude, will become 'synonymous with archivist at best, and clerk at worst'. Again to quote from Professor Salton's seminar material and his useful paper in *Library Journal*: 'Librarians have to look again at their role in society, to change their outlook: for professionals we do too much that could be clericalized, are too concerned with acquisition and completeness rather than selectivity and accessibility, with independence rather than co-operation . . . Librarians are not innovative, if they really were they could exercise considerable influence on problems and situations caused by literature growth and storage space pressures.'

Let us go on to the book literature which represents much of our special library stocks. Keeping its quality, scope and currency at a satisfactory level within cost and space considerations is equally as important as it is for the periodicals, but the problems are different, more complex, and involve us in more effort. While the abstracting services give us access in fair measure to the periodical literature, useful descriptive guidance to book content is rare. We have to catalogue and index, and suitably display, the non-periodical literature. Only in the last three years, with the internationally developing MARC (MAchine Readable Cataloguing) project, has come the potential of overcoming the enormous duplication of cataloguing efforts in thousands of libraries. Also the opportunity of giving library staffs and customers alike, greatly improved accessibility features in our catalogues. Instead of the restricted access of staff-oriented catalogues (often frustrating even to the staff), we can use mechanized techniques to provide multi-access records. These can range from the 'quick and dirty'—but highly effective—word permutation types (Figure 1), to the hierarchical classifications like UDC (Figure 2). And we can provide them in book, card, film and eventually on-line display forms, vastly more desirable to most users. MARC based catalogue systems (see reference to Corbett) are pretty formidable (Figure 3) but of great potential. However, even with a highly user-oriented index to our stocks, the larger they grow the smaller becomes the proportion of them that is earning its keep, while the wanted become more difficult to find. Our energies need to be applied to saving user effort, and most important, doing our utmost to provide only the locally relevant, the useful, the quality, the up-to-date, bearing in mind external availability by loan or consultation or collaboration with, kindred, regional, national or commercial services.

By knowing our customers better, and using them to help us assess our acquisitions and our discarding, the relatively minute local representation we have of the total literature will be the more easily accessible and give a higher retrieval precision.

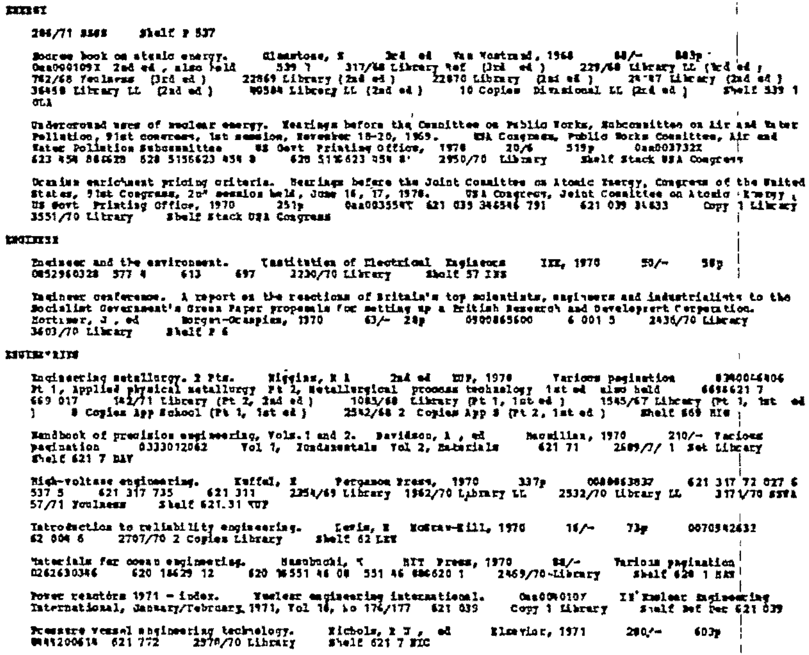
While MARC is developing as an external source of fully catalogued international book literature data which can rationalize cataloguing, it can also usefully influence book selection. MARC's potential for book selection (and of course for alerting) lies in reducing the present rejection characteristic in practical book selection. The computer, given a subject extraction profile, can present the librarian with a more manageable and significant number from which to select; for example, our present extract from MARC eliminates 80 per cent of the new British book descriptions, and even more of the American (Figure 4).

With the French and German bibliographies becoming available in MARC format next year a sizeable proportion of the current world book literature will be in fully catalogued machine readable form. This represents a massive potential for rationalization of library procedures from book selection, through the production of improved local and co-operative catalogues, on to national library network services.

To exploit this potential, however, towards the objective of maximum user accessibility is likely to be a long road with large obstructions—political, economic, prejudicial—to be overcome. New organizational patterns and procedures on the national network scale are unlikely to develop quickly. Changes affecting library/information centre operations are more likely to be produced by internally generated pressures of costs and space forming realizations that 'something must be done', rather than by planned imposition from government or national bodies. In the end faster and easier adoption of mechanized procedures (for example, by availability of packaged software) will produce the really important changes in library administration and practice.

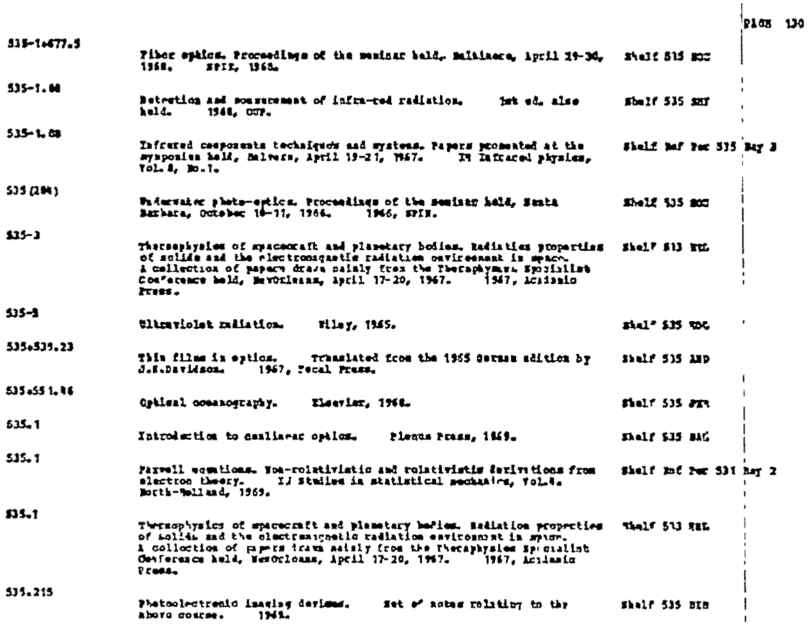
Interesting aspects of the problems of exploiting MARC, of librarians' attitudes, and the fact that a large proportion of MARC subscribers are not using the tapes at all are highlighted in the paper by H. Griffin on MARC users.

Stock and records we have considered from the literature point of view, but our internal information potential in the shape of the organization's own staff and their experience are also essentially our information resource or stock. In



```
ENERGY

    286/71 8868     Shelf P 537

    Source book on atomic energy.     Glasstone, S      3rd ed   Van Nostrand, 1968     88/-     883p
    0aa000109X  2nd ed , also held       539 7      317/68 Library Ref  (3rd  ed )      229/68 Library LL (3rd ed ;
    782/68 Foulness  (3rd ed )      22869 Library (2nd ed )      22870 Library  (2nd ed )      24787 Library (2nd ed )
    36458 Library LL  (2nd ed )      40584 Library LL (2nd ed )      10 Copies  Divisional LL (3rd ed )      Shelf 539 1
    GLA

    Underground uses of nuclear energy.  Hearings before the Committee on Public Works, Subcommittee on Air and Water
    Pollution, 91st congress, 1st session, November 18-20, 1969.     USA Congress, Public Works Committee, Air and
    Water Pollution Subcommittee     US Govt  Printing Office,  1970      20/6      519p      0aa003732X
    623 458 886628  628 5156623 458 8     628 5156623 458 8'     2950/70  Library      Shelf Stack USA Congress

    Uranium enrichment pricing criteria.  Hearings before the Joint Committee on Atomic Energy, Congress of the United
    States, 91st Congress, 2nd session held, June 16, 17, 1970.     USA Congress, Joint Committee on Atomic Energy ,
    US Govt  Printing Office, 1970       251p      0aa003558T  621 039 346546 791      621 039 34633      Copy 1 Library
    3551/70 Library      Shelf Stack USA Congress

ENGINEER

    Engineer and the environment.     Institution of Electrical  Engineers      IEE, 1970       50/-      58p
    0852960328  577 4      613      697      2230/70 Library      Shelf 57 INS

    Engineer conference.  A report on the reactions of Britain's top scientists, engineers and industrialists to the
    Socialist Government's Green Paper proposals for setting up a British Research and Development Corporation.
    Mortimer, J , ed      Morgan-Grampian, 1970       63/-  28p       0900865600       6 001 5      2436/70 Library
    3603/70 Library      Shelf P 6

ENGINEERING

    Engineering metallurgy. 2 Pts.      Higgins, R A       2nd ed   EUP, 1970       Various pagination       0340046406
    Pt 1, Applied physical metallurgy  Pt 2, Metallurgical  process technology  1st ed  also held       6698621 7
    669 017      142/71 Library (Pt 2, 2nd ed )       1083/68  Library (Pt 1, 1st ed )       1545/67 Library (Pt 1, 1st  ed
    )      8 Copies App School (Pt 1, 1st ed )      2542/68 2  Copies App S (Pt 2, 1st ed )      Shelf 669 HIG

    Handbook of precision engineering, Vols.1 and 2.   Davidson, A , ed      Macmillan, 1970       210/-  Various
    pagination      0333012062      Vol 1,  Fundamentals  Vol 2, Materials      621 71      2689/7/ 1  Set Library
    Shelf 621 7 DAV

    High-voltage engineering.      Kuffel, E      Pergamon Press,  1970      337p       0080063837      621 317 72 027 6
    537 5      621 317 735      621 311      2254/69 Library  1962/70 Library LL     2532/70 Library LL      3171/70 SSTA
    57/71 Foulness      Shelf 621.31 KUF

    Introduction to reliability engineering.     Lewis, E   McGraw-Hill, 1970       16/-      73p       0070942632
    62 004 6      2707/70 2 Copies Library      Shelf 62 LEW

    Materials for ocean engineering.      Masubuchi, K       MIT  Press, 1970       84/-      Various pagination
    0262630346      620 18629 12      620 18551 46 08  551 46 886620 1      2469/70-Library      Shelf 620 1 MAS

    Power reactors 1971 - index.      Nuclear engineering international.      0aa0040107      In Nuclear Engineering
    International, January/February 1971, Vol 16, No 176/177   621 039      Copy 1 Library      Shelf Ref Per 621 039

    Pressure vessel engineering technology.      Nichols, R W ,  ed      Elsevier, 1971       200/-      603p
    0444200618  621 772      2370/70 Library      Shelf 621 7 NIC
```

FIG. 1: *AMCOS Main Keyword Catalogue*



```
                                                                                                PAGE  130
535-1+677.5
                     Fiber optics. Proceedings of the seminar held, Baltimore, April 29-30,    Shelf 535 SOC
                     1968.      SPIE, 1968.

535-1.00
                     Detection and measurement of infra-red radiation.      1st ed. also       Shelf 535 SMI
                     held.      1968, OUP.

535-1.08
                     Infrared components techniques and systems. Papers presented at the       Shelf Ref Per 535 Bay 3
                     symposium held, Malvern, April 19-21, 1967.      In Infrared physics,
                     Vol.8, No.1.

535(204)
                     Underwater photo-optics. Proceedings of the seminar held, Santa           Shelf 535 SOC
                     Barbara, October 10-11, 1966.      1966, SPIE.

535-3
                     Thermophysics of spacecraft and planetary bodies. Radiation properties    Shelf 513 THE
                     of solids and the electromagnetic radiation environment in space.
                     A collection of papers drawn mainly from the Thermophysics Specialist
                     Conference held, NewOrleans, April 17-20, 1967.      1967, Academic
                     Press.

535-8
                     Ultraviolet radiation.      Wiley, 1965.                                 Shelf 535 UDC

535+539.23
                     Thin films in optics.      Translated from the 1965 German edition by    Shelf 535 AND
                     J.N.Davidson.      1967, Focal Press.

535+551.46
                     Optical oceanography.      Elsevier, 1968.                               Shelf 535 JER

535.1
                     Introduction to nonlinear optics.      Plenum Press, 1969.               Shelf 535 BAG

535.1
                     Maxwell equations. Non-relativistic and relativistic derivations from    Shelf Ref Per 531 Bay 2
                     electron theory.      In Studies in statistical mechanics, Vol.4.
                     North-Holland, 1969.

535.1
                     Thermophysics of spacecraft and planetary bodies. Radiation properties    Shelf 513 THE
                     of solids and the electromagnetic radiation environment in space.
                     A collection of papers drawn mainly from the Thermophysics Specialist
                     Conference held, NewOrleans, April 17-20, 1967.      1967, Academic
                     Press.

535.215
                     Photoelectronic imaging devices.      Set of notes relating to the       Shelf 535 BIB
                     above course.      1969.
```

FIG. 2: *UDC Subject Index*

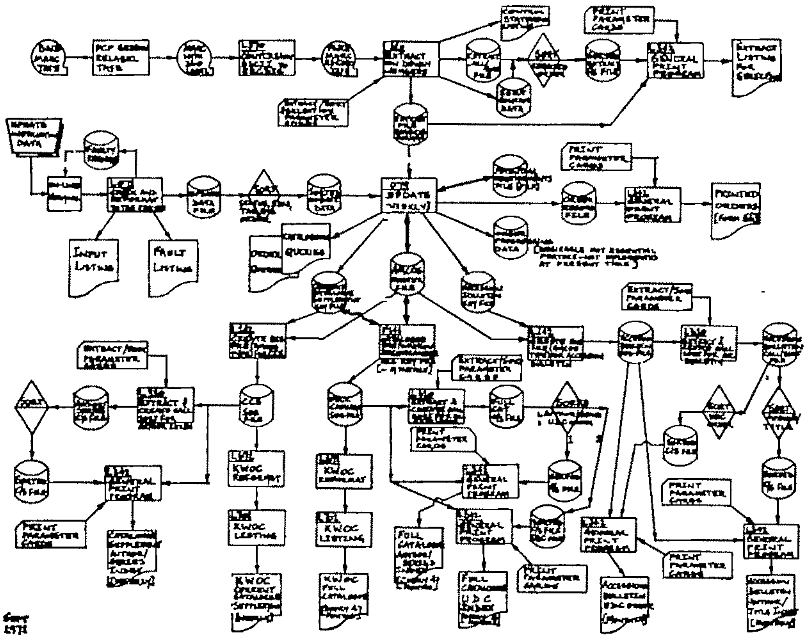


FIG 3: *AMCOS—Stage 2*

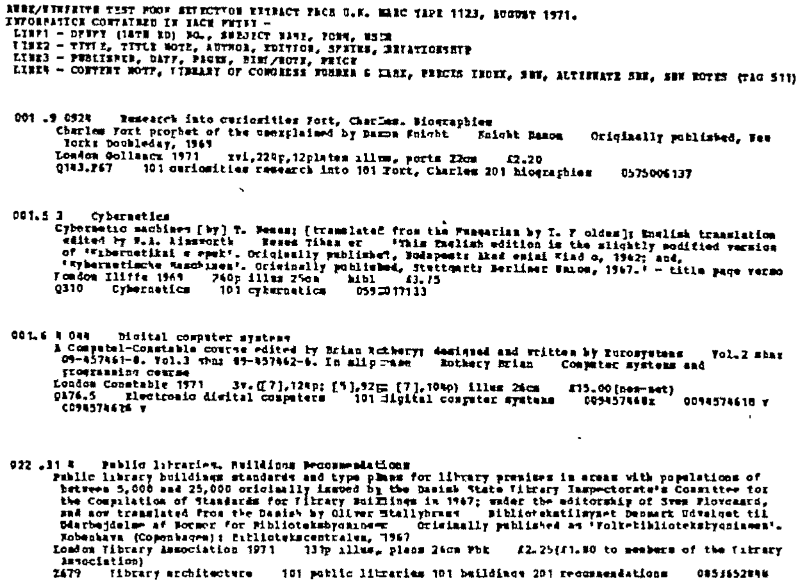

```
AWRE/WINFRITH TEST BOOK SELECTION EXTRACT FROM U.K. MARC TAPE 1123, AUGUST 1971.
INFORMATION CONTAINED IN EACH ENTRY -
 LINE1 - DEWEY (18TH ED) NO., SUBJECT NAME, FORM, USER
 LINE2 - TITLE, TITLE NOTE, AUTHOR, EDITION, SERIES, RELATIONSHIP
 LINE3 - PUBLISHER, DATE, PAGES, BIBL/NOTE, PRICE
 LINE4 - CONTENT NOTE, LIBRARY OF CONGRESS NUMBER & CLASS, PRECIS INDEX, SBN, ALTERNATE SBN, SBN NOTES (TAG 511).


 001 .9 0924    Research into curiosities Fort, Charles. Biographies
       Charles Fort prophet of the unexplained by Damon Knight    Knight Damon    Originally published, New
        York: Doubleday, 1969
       London Gollancz 1971    xvi,224p,12plates illus, ports 22cm    £2.20
       Q143.F67    101 curiosities research into 101 Fort, Charles 201 biographies    0575006137


 001.5 3    Cybernetics
       Cybernetic machines [by] T. Nemes; [translated from the Hungarian by I. F oldes]; English translation
        edited by B.A. Ainsworth    Nemes Tihamer    'This English edition is the slightly modified version
        of "Kibernetikai gepek". Originally published, Budapest: Akademiai Kiado, 1962; and,
        'Kybernetische Maschinen'. Originally published, Stuttgart: Berliner Union, 1967.' - title page verso
       London Iliffe 1969    260p illus 25cm    bibl    £3.75
       Q310    Cybernetics    101 cybernetics    0592017133


 001.6 4 044    Digital computer systems
       A Computel-Constable course edited by Brian Rothery; designed and written by Eurosystems    Vol.2 sbn
        09-457461-8. Vol.3 sbn 09-457462-6. In slip case    Rothery Brian    Computer systems and
        programming course
       London Constable 1971    3v.([7],124p; [5],92p; [7],104p) illus 26cm    £15.00(non-net)
       QA76.5    Electronic digital computers    101 digital computer systems    009457460x    0094574610 v
        0094574626 v


 022 .31 4    Public libraries. Buildings Recommendations
       Public library buildings standards and type plans for library premises in areas with populations of
        between 5,000 and 25,000 originally issued by the Danish State Library Inspectorate's Committee for
        the Compilation of Standards for Library Buildings in 1967; under the editorship of Sven Plovgaard,
        and now translated from the Danish by Oliver Stallybrass    Bibliotekstilsynet Denmark Udvalget til
        Udarbejdelse af Normer for Biblioteksbygninger    Originally published as 'Folkebiblioteksbygninger'.
        Kobenhavn (Copenhagen): Bibliotekscentralen, 1967
       London Library Association 1971    131p illus, plans 24cm Pbk    £2.25(£1.80 to members of the Library
        Association)
       Z679    Library architecture    101 public libraries 101 buildings 201 recommendations    0853652846
```

FIG. 4: *AMCOS book selection from MARC*

spite of the experimental demonstration and verification of information use patterns by Professor Allen of MIT—and his emphasis on the role of gatekeepers or key communications/ideas men in an organization—few libraries have in fact organized their procedures and keyed their services sufficiently to exploit this resource. We need to devote more effort to studying and reporting on literature and information access, use, needs and benefits. Are our search attitudes right? Possibly many of our searches should not be done at all but satisfied by using intrapersonal contacts? Where we give a customer fifty references might we, by closer collaboration, have found the ten he used, while he clarified or satisfied his need from the text and further citations from two of these?

(c) Co-operation—the need to use external services for information and literature

It is vital to have clearly defined questions in using external sources. Thought and care are needed in the formulation of the question, to define its scope, depth, time factors, intellectual level, etc. In internal enquiries we often do not clarify the need adequately, but in this case we can alter search requirements and strategies as we go. Such heuristic techniques cannot be used for most external sources. If using computer searching one must specify precisely what is wanted before the search begins. Every SDI system has experienced at least once the case of the loosely formulated question which retrieved practically the whole literature base being searched. This need for careful preparation is one of which we are all aware, but often in practice we fail to apply the necessary effort. Its importance is increasing more and more for we must face the fact that retrospective literature searching by machine has arrived. Some systems have been available for some time, for example, IBM's ITIRC, MIT's MAC and INTREX, Euratom, RECON in the USA and at ESRO. The interactive systems do give the user the chance to change his search strategy. Though so far only one or two such systems are available, their accessibility is increasing. Just recently also have come the *Chemical Abstracts* indexes (pink pages) on tape. ICI have taken the initiative here and are experimentally cumulating them continuously onto film by COM techniques.

An aspect of using external systems which is related to attitudes again is the reluctance of some information workers to go outside—with time-consuming searching, and possibly inadequate results. This is particularly true when there has been insufficient dialogue with the questioner. Also the newly published paper can be twelve months or more behind the author's current work. Maybe not enough is done in training, at meetings, and in the literature, to break down coyness, secrecy, false pride, lack of humility or other factors responsible for such attitudes.

In contrast over-confident use of machine searching has dangers too, particularly when literature bases at present are usually restricted to one source, and reliance on this can mean that only part of the potentially relevant might be found, and significant papers missed. Davison of SDC in Scotland has illustrated this, for example, in his paper on magnetic tape life and reliability in *Computer Journal*.

Generally speaking, retrospective searching (or indeed current awareness) from multiple sources cannot be done locally on a machine basis. The first experimental steps are just being taken on merging data bases or alternatively searching several bases and merging the results. We could, for example, do the latter now by searching *CT*, INSPEC, *NSA*, *US GRA* and BNB MARC for some subjects where all might find some references, then merge the results while eliminating duplicates. We already have some users taking output from several of these but to merge them would be an expensive luxury. Again, some of us have cumulations of our tape bases over several years. At this stage these are mainly investment. So far we ourselves have found little demand for retrospective machine searches, though the capability is desirable of doing so back at least to the first cumulated index of the printed version. Presently available procedures (batch processing) for doing such a search on more than one source or base are generally clumsy and time consuming.

Several places, including UKCIS at Nottingham, are investigating retrospective needs, and some members of EUSIDIC tentatively invited tenders for their quantitatively considered SDI and retrospective requirements. Pittsburgh, Georgia (COSMOS) and IIT processing centres offer retrospective searches on some bases. ESRO's RECON interactive video system has aerospace, metals and engineering bases available, and is actively involved in many problems relevant to the direct-use interactive system. Externally commissioned searches, current or retrospective, can be expensive, and question formulation for them has to be carefully done. Though in essence careful search formulation is always necessary, paying for it enhances the need. Among the practical considerations in this are: how the literature base concerned suits the subject of the question; does it cover the core journals of the subject? the adequacy of the indexing language, if any; are reports or books included? are references of Russian or Japanese papers to their translated versions? is the particular kind or level of wanted paper included?

On external borrowing and translations I would like to make a brief point on following-up SDI outputs. When we started SDI at Aldermaston four to five years ago I analysed some of what Resnick of IBM called 'second responses', i.e. customer reactions to actual papers borrowed as a result of the alerting. These are given in the *Information Scientist* and *Program*. Briefly we found that about 50 per cent of loan requests from SDI have to be borrowed externally, and over 50 per cent of these were rated as useful. Of foreign language papers 50 per cent were useful, of English language 75 per cent. These indicate a real measure of user appreciation of a good follow-up service and justify the money and effort it involves.

On the matter of costs, I feel that literature-on-tape leases are too expensive. Some examples of tape costs and comparisons with their published equivalents are: *US GRA* ($1,000) is seventeen times the printed abstracts and indexes ($60); *Chemical Titles* ($1,700) twenty-eight times ($60); *Metals Abstracts* ($1,250) three times ($450); INSPEC ($6,000) ten times ($600); *Engineering Index* ($6,500) thirteen times ($500). Like many other products today they appear to be priced to a market level the customer can be induced to pay, rather than being based on cost of production, some exploitability value or factor, plus reasonable profit. Tapes can also be regarded as by-products (and sometimes rather crude ones) of the more or less obligatory mechanization of secondary publications. This is a rather gross simplification, but it means that for the medium sized non-subsidized organization, *US GRA*, *Metals Abstracts* and *Chemical Titles* price levels are reasonable propositions for service development, but with the higher priced tapes a largish number of customers is required to keep SDI per-head costs in the desirable range of £35 or less (Table 1). Our 'in-house' services disseminate some five hundred sets of references every two weeks to 180 people on their particular continuing subject interests. These come from three regular bases covering a quarter of a million documents a year in a wide subject spectrum. Such lists cost about 40p ($1) each (lease plus machine costs only). They may of course be worth many times this in terms of value, convenience and time-saving to the recipients. Though cheap compared with 'custom' services, continuous promotional and monitoring efforts have to be maintained to keep up the number of customers, and hence keep down the price per head.

Staff effort required to run SDI tape services is quite considerable. Staff must be knowledgeable in the literature generally, in the scope and characteristics of the particular tape services, and in the users and their interests. If the operation is run 'in-house' good systems support is essential, and the information manager must be generally knowledgeable of machine techniques, sensitive to developments, and persistent in character to cope with operational problems.

On the worthwhileness of SDI, its necessity, methods, philosophy, together with analyses of results, these are discussed usefully in such selected papers as those referenced: M. Williams to the 1971 Cranfield IS and R conference, Dr Rowlands, H. Dammers and Dr Kent to the same 1969 conference, H. Dammers to the FID/IFIP Mechanised IS & R conference, Rome, 1967, Barker/UKCIS report of 1970, and Corbett.

There have of late been signs of a possible trend towards contracting-out mechanized SDI and retrospective searching operations to specialized information processing centres. Costs, labour and particularly computer equipment pressures are influencing policies even in large organizations like Dow Chemicals in the USA. Other factors include the rapid growth in number, subject coverage and scope of available literatures on tape, exampled by their tabulation by Carroll of AIP Information Division. Another factor is a current management policy trend towards buying complex services having high cost characteristics, rather than providing them themselves. Williams's paper is an example of the rapid growth and complexity of operations of an information processing agency or wholesaler. Whether of this subsidized or the commercial type, such agencies, together with primary and secondary literature producers' services, are part of the complex external literature/information scene faced by the user librarian or information specialist.

Conclusion

I have discussed summarily some of the situations and problems relevant to developing attitudes towards, and use of, external information and literature. Many others have been omitted or barely mentioned, for example, the changing roles of customer and librarian/information worker in the machine retrieval era; negotiated sharing of expensive specialized publications or services such as

TABLE 1: *Comparison of costs for in-house SDI illustrated by the 1970 situation at AWRE*

Source	*Cost A+B*	NUMBERS OF: *Users*	*Questions*	*Search Words*	*References Per Run*	COSTS *Per User*	*Per Question*	*Per Search Word*	*Per Reference*	*Custom Service*
CT+) NSA)	2,640	113	350	5,000	3,200	£23	£10.10	14s	8d	—
CT	2,160	70	230	2,800	2,500	£30	£9	15s	1/6d	+£45
NSA	480	43	120	2,100	700	£11	£4	4/6d	7d	—
INSPEC	3,000	46	125	1,700	1,000	£65	£25	35s	2/4d	+£60

A = lease, tape, postage costs
B = machine processing costs

Beilstein or *Science Citation Index*; co-operative mechanized cataloguing systems; the on-line information network or utility concept which someone has suggested calling 'infocare' (cf. the American Medicare, medical diagnosis service); the more immediately possible 'linking-into' on-line systems like RECON; costs features, user acceptability and other problems in using microtext tools—such as product/manufacturers' data, or abstracts like *CA* or INSPEC, or even our own book catalogues; problems and techniques in handling external literature on tape—compatibility, package software, file formats and reformatting, code translation, co-operative processing; telefacsimile, or remote access interactive retrieval systems with telefacsimile; networks; and lastly, possibilities in computer-microfilm relationships.

I think it would be helpful to progress if librarians and information workers were more experimentally minded, and published as notes or letters their findings and comparisons on the characteristics and effectiveness of literature and information sources, including cases evidencing the impact of information on the policies or economics of particular research, development or production projects.

Many librarians and information workers favour ignoring such problems, pressures and trends as I have touched on briefly here. They hope to avoid them as long as possible. But as automation develops both are being affected. In this field we must all professionally adopt more dynamic attitudes. To be scared and make no active contributions to how new technologies are applied, means likely professional relegation at best, suicide at worst, both on the individual and institutional levels.

BIBLIOGRAPHY

ALLEN, T. J. Organisational aspects of information flow in technology. *Aslib Proceedings*, Nov. 1968, p. 433–54.

BARKER, KENT *and* VEAL. Report on the evaluation of an experimental computer-based current awareness service . . . . London: Chemical Society, 1970. *UKCIS report no. 1.*

BROOKES, B. C. The optimum P% library of scientific periodicals. *Nature*, 13 Aug. 1971, p. 458–61.

BROOKES, B. C. Obsolescence of special library periodicals: sampling errors and utility contours. *J. Amer. Soc. Inform. Sci.*, Sept.–Oct. 1970, p. 320–9.

CARROLL, K. D. Survey of scientific-technical tape services. American Institute of Physics, *AIP ID 70–3*. Sept. 1970.

CORBETT, L. Using commercially available literature tapes for a current awareness service. *Information Scientist*, Nov. 1968, p. 83–102, *and* further progress in *Program*, Oct. 1970, p. 141–9.

CORBETT, L. *and* GERMAN, J. AMCOS project stage 2: a computer aided integrated system using BNB MARC literature tapes. *Program*, Jan. 1972, p. 1–35.

DAMMERS, H. F. Integrated information processing and the case for a national network. *Inform. Stor. Retr.*, 4, 1968, p. 113–131.

DAMMERS, H. F. Computer use in information and data handling: an appraisal of its economic aspects. *Inform. Stor. Retr.*, 6, May 1970, p. 17–28.

DAVIES, J. R. The problem of information exchange and the complete information centre concept. *Information Scientist*, June 1970, p. 39–45.

DAVISON, P. S. Ageing of magnetic tape: a critical bibliography and comparison of literature sources. *Computer Journal*, Nov. 1968, p. 241–6.

GRIFFIN, H MARC users: . . . *In*: HENDERSON, K. L. *ed.* Proc. of 1970 Clinic on library applications of data processing. London: Bingley, 1971.

HARMON, G. H. The computer-microfilm relationship. *Special Libraries*, July–Aug. 1971, p. 279–82.

KENT, A. R. Performance and cost of 'free-text' systems. *Inform. Stor. Retr.*, 6, May 1970, p. 73–7.

OVERHAGE, C. F. J. Science libraries: prospects and problems. *Science*, 17 Feb. 1967.

REDMOND, D. A. Network characteristics. *Special Libraries*, July–Aug. 1971, p. 257–64.

ROWLANDS, D. G. The Unilever research SDI system. *Inform. Stor. Retr.*, 6, May 1970, p. 53–71.

SALTON, G. On the development of libraries and information centers. *Library Journal*, 15 Oct. 1970, p. 3433–42.

SHERA, J. The compleat librarian and other essays. Case Reserve Western University, 1971.

STANFORD RESEARCH INSTITUTE. The corporate library/information center. SRI Long Range Planning Service, report 363. December 1968.

WEIL, B. H. Document access—a state of the art review. *J. Chem. Doc.*, Aug. 1971, p. 178–85.

WEINSTOCK, M. Network concepts in scientific and technical libraries. *Special Libraries*, May–June 1967, p. 328–34.

WILLIAMS, M. E. Experiences of IIT Research Institute in operating a computerized retrieval system for searching a variety of data bases. Paper to 3rd Cranfield IS and R conference 1971 (to be published in *Inform. Stor. Retr.*).

DISCUSSION

PROF. E. PIETSCH said that one thread running through all the discussions had been that relating to users and their relations with information systems, and he emphasized the need for research on how users can be helped to make better use of the information services now available. The FID Committee on Education and Training has made recommendations to national governments and others to initiate research in universities on user reactions to information systems.

MR M. W. HILL (NRLSI) referred to the speaker's suggestion for selective discarding in order to overcome increasing costs and mentioned that a recent study among university libraries showed that the cost of borrowing was going up faster than cost increases resulting from purchasing material. He suggested that it might be cheaper to allow individual users to borrow direct from external libraries without going through their own library and information units.

MR S. LOYNES (Wiggins Teape) suggested that the speaker's remarks would be of most interest to those who had access to computers and sophisticated systems in their own organizations and that these were in the minority. Nevertheless the speaker has stressed two points of general importance: first the reluctance of information officers to ask for help from external sources in case their managements thought they were not capable of doing their job, an attitude with which he thoroughly disagreed; and secondly, the importance of developing a dynamic attitude towards information in the organization which the information serves.

MR CORBETT pointed out that someone has to do the pioneer work of testing and evaluating external systems and that everyone benefits in some way or other from the experience gained by those who do have access to computers.

MRS I. V. WHITE (NPL) thought that we were once again preaching to the converted. The main problem was to get over to management that the training of users was necessary and that money should be provided for this exercise.

THE CHAIRMAN, MR J. S. RIPPON (Metal Box) said we must do everything possible to make management realize what powerful information resources are now available. The information officer must be prepared to sell his requirements to management on a soundly costed basis.

MR F. LIEBESNY (Transociates Ltd) made three comments: (1) FID was trying to establish minimum international standards for the training of users. (2) Round table meetings with management to discuss these points had been undertaken by Aslib. (3) He was concerned at the attitude of the purveyor of information and about our moral responsibility in this matter. How much information are we asked to suppress or ignore?

MR S. FRANCIS (N. London Polytechnic) asked what the reasons were for the 50–52 per cent level of literature references resulting from SDI notifications having to be borrowed from outside AWRE.

MR CORBETT said the reason was not, as perhaps implied, because of poor stock selection in the first place, but mainly because of the extensive subject coverage in the establishment and the very large range of literature sources of the SDI bases.

MR R. G. GROEGER (John Laing R & D Ltd) said that it was surprising to hear Mr Corbett talking about the reluctance of library staff to use external sources. It would be useful to revert to a term heard in the first session—library cunning. This should include the knack of finding short-cuts to enquiries by using outside sources. It usually produces results which earn admiration from the enquirer—who is generally not interested in knowing where the information was obtained. Even if he is told, he still credits the library staff of his own organization with efficiency—and library cunning!

On another aspect of Mr Corbett's paper, attention must be drawn to the need for technical validation of references and information drawn up by non-technical library staff. It is very useful to find someone technical within the organization to scan quickly these references to avoid too many 'boobs' with totally irrelevant ones. Information workers neatly dismiss these as 'noise', but too much noise of this type shakes the faith of the enquirer in the library.

Finally, a few words about the cost effectiveness of SDI services. Usually the cost of a *really* deep service is out of all proportion to its use. However, SDI can be used effectively if it is beamed at top management for a limited period. It will at least make the directors aware of the existence of the library, and if properly done, will impress them. When this has been achieved, the service can gradually be withdrawn, but it will leave the top management library conscious. For ordinary use, experience in many organizations has shown that SDI should only be provided in very broad terms, if at all. Library staff should adapt supermarket techniques—attract the customer by suitable displays (say, well printed lists of abstracts), guide him to the departments he is looking for (say, by suitable shape coding for subjects) and finally let him select for himself what he wants. Copies of library abstracts, lists and other library publications should be freely distributed to users who should be encouraged to throw them away after use like cups, towels and underwear made of paper!

MR T. AITCHISON (INSPEC) said that the speaker had mentioned the high cost of external information services. The explanation was that each of the services provided by an external organization (tape, SDI, publications, etc.) which are produced from a data base must contribute to the cost of setting up that data base.

MR LEA (RCC) had found that SDI services produced useful spin-off. Users, and particularly groups of users, often build up useful card indexes from them for group use, card indexes which can be easily maintained by quite junior members of the team.

UNISIST: A forum

Scott Adams, John Gray
Herbert Coblans and F. W. Matthews

Proceedings of the final session of the 45th Aslib Conference, Darmstadt, West Germany, 10th–14th October 1971

1. SCOTT ADAMS, *National Academy of Sciences, Washington*

The origins of the UNISIST programme proposals are to be found in the concerns of the scientific community itself for the survival of its traditional communication institutions. From the outset, the concern transcended political and ideological boundaries. Scientists of East and West, meeting under Pugwash Conference auspices, in Karlovy Vary in 1964, viewed the tendency toward fractional and unco-ordinated mechanization of information processing in different countries and in different fields of science with apprehension. Were the sciences in the process of creating in the electronic age a new Tower of Babel? Would the adventitious application of technology defeat the fundamental purpose of free and open scientific communication among all nations?

The International Council of Scientific Unions (ICSU), pursuant to these discussions, proposed to Unesco in 1966 the conduct of a joint feasibility study by the two organizations of a 'world science information system'. Implicit in earlier discussions had been the concept of a single 'system', a modern variant of the Wellsian 'World Brain'. A committee of experts, meeting in January 1967 to define the guidelines of the joint study, reduced the study to more realistic confines. It proposed, as a basic guideline, that 'the world science information system under study must be considered as a flexible network based on the voluntary cooperation of existing and future information services.'

The study continued for three years until 1970. The UNISIST Central Committee produced a report, which was prepared by Jean-Claude Gardin, under contract to Unesco. The synopsis of this report, of which I have the honour to be the author, became the working document for the conference.

There are twenty-two recommendations in the report, grouped under five programme objectives. The first objective of the UNISIST programme is defined as follows: 'UNISIST should work toward the improvement of tools of systems interconnection'. Grouped under this objective are six recommendations which have to do with improving the interchange of information. They range from standardization of elements of bibliographic description for machine retrieval systems, to further work on subject classification, to the creation of international serials data system. These six recommendations will have considerable interest for professionals in the information science field.

The second programme objective has to do with the strengthening of the functions of the institutional components, libraries, documentation centres, translation centres, indexing and translating services. This group of recommendations is concerned with improving the ability of the classic services to function. Considerable stress is also laid upon the function of information analysis centres in the reduction and compression and evaluation of scientific information.

A third programme objective is concerned with the development of human resources that are necessary for all countries, developing as well as developed. Not only is the need for more librarians and information technicians underlined; the fact that the scientist user must be trained as well is also stressed.

A fourth group of five recommendations has to do with improving the economic and political environment for information services. These are recommendations addressed by and large to governments, urging them as OECD has urged in the past, to create national focuses for the development of information policies, to provide support for domestic and international information activities, urging them to reduce unnecessary legal barriers to the international flow of information.

The final and fifth programme objective has to do with aid to the developing countries of the world. There are two recommendations here: one urges these countries to concentrate on the development of infrastructure, strengthening, for example, the basic library structure the countries need first before they can possibly derive profit from any of the more sophisticated systems being developed in the industrialized countries; and the second has to do with experimental activities that could be undertaken, whereby a more advanced developing country could be linked up with one or more systems in one of the countries.

Finally, there is a twenty-second recommendation having to do with organization. This is the one which drew the most interest at the conference itself. It calls for the establishment of a modest Secretariat within Unesco, for a 'Steering Committee', and for a Scientific Advisory Group.

I have two last points before I close, Mr Chairman. The first of these is that the working party charged with developing the guide lines, which defined UNISIST not as a giant centre, not as a super-system, but as a programme working to enhance the voluntary co-operation needed to make an evolving network of services, served to professionalize the UNISIST study. The UNISIST Intergovernmental Conference, on the other hand, turned out to be an experience in the politicizing of UNISIST. The political aspects, interestingly enough, did not reflect an East–West division. The principal political differences were between the developing countries and the industrialized countries, with the developing countries insisting that their needs receive priority attention.

The second remark I would like to make is that UNISIST is reminiscent of Voltaire's dictate about the Holy Roman Empire. UNISIST is titled a 'feasibility study on a world science information system'. If you will bear with me for just a moment I should like to parse that phrase. In the first place, it is a study in political 'feasibility' and not a study of technical or economic feasibility as we commonly understand the term. In the second place, those of us who attended the Conference were reminded forcibly by the delegates of such countries as the People's Revolutionary Government of Cuba, that there are areas of the world that are not included in UNISIST. Again, the information with which

UNISIST is concerned is not purely science. There were very strong pressures from the very beginning to broaden the conceptual base to technology, and, as many of you know, there are strong forces at work to include the social sciences and humanities as well. Finally, as I hope I have demonstrated by now, UNISIST is not a 'system'; it is a programme oriented towards increasing voluntary co-operation. I think that is all I would like to say at this point, Mr Chairman. Thank you.

2. JOHN GRAY, *OSTI, London*

Reading the reviews of the UNISIST study report which are just coming out in the UK and elsewhere, one finds the question asked: why have another international organization working in this field, when there exist non-government organizations on a world basis and government organizations on fairly wide regional bases. UNISIST is a world-wide initiative of governments and scientific communities and, as it has now evolved, is essentially a means of relating public funds to worldwide action and of stimulating and co-ordinating the contributions that can be made, with or without these funds, by a variety of organizations. I am glad that Scott Adams has brought out clearly in his excellent summary the two important points, that UNISIST is now clearly defined as a programme of action towards a world system and not a philosophy or system in itself; and that the term 'world system' is now defined much more realistically in terms of a network of voluntary co-operation and not as a highly centralized activity. I do not think that UNISIST would get very far unless it was based on these two realistic premises.

The Conference expressed a strong wish that for the purposes of UNISIST science should be interpreted as science and technology and should be extended to the social sciences as soon as possible. I have the impression that this view was accepted by Unesco's Director General. The Conference also advocated an extension of the existing co-operation between Unesco and ICSU to include other world organizations that have an interest in the subject, and it is possible that, when the proposed scientific advisory committee is set up, Unesco will consult with a wider range of organizations and not just with ICSU.

So far as the UK Government is concerned the Conference resolution, if acted on, will mean a geographical extension of activities which the UK is already conducting bilaterally or regionally in bodies such as OECD. If the UK decides to join the European Economic Community, there will be another major extension of current activity. Like other countries in EEC the UK will have to consider which activities are appropriately tackled in EEC, which in OECD and which in UNISIST, and how far these three contributions can and should interact. For example, Recommendation 17 in the UNISIST report is concerned with computer networking; this is already being considered in OECD and EEC, and within ESRO/ELDO an experimental network is operating, as you will know from earlier talks this week. Manpower development (Recommendation 13) and pricing policy (Recommendation 18) are both being studied in OECD and, of course, it will be important for Unesco not to duplicate effort already expended by these organizations. Finally the national science information agencies called for in Recommendation 15 either exist, or very soon will exist, in every OECD country and their potential scope, functions, forms and methods are being explored by a series of penetrating reviews of national policies in different countries, notably that of our host country, Germany, which is preparing for a review either next year or the year after.

These recommendations are described in the UNISIST study report as catalytic recommendations; that is to say, they call on Unesco to act as a catalyst to activities elsewhere. These recommendations affect governments in the main though some, notably Recommendation 11 which is for editors and Recommendation 12 for learned societies, are aimed at the scientific communities; Recommendation 7 is aimed primarily at libraries and librarians, and Recommendation 8 at information centres. Perhaps the most interesting group of recommendations are those which involve new action and new forms of expenditure by Unesco. The most precisely expressed of these are the recommendations that affect the tools of connection between systems. They are more precise than the other recommendations because more effort was made in the preliminary stages of UNISIST thinking to define, and in some cases start, projects that could be undertaken at an early date. Such projects call equally for experts in information systems and for those, in government or elsewhere, who are responsible for decisions about systems inter-connection. The work already completed on a manual of bibliographic descriptors and on a serials data system has already shown that, given small expert working groups, given money for contracts and given the will to achieve something, effective projects can be carried out under the UNISIST banner. In both the projects mentioned the UK has already made a substantial contribution. I would hope that this kind of contribution can be sustained in the projects to come, especially those relating to Recommendation 4 on indexing languages, where there is plenty of UK experience to draw on. I would expect our specialists to play a significant part in the expert groups that are set up for this purpose, just as Herbert Coblans, Douglas Foskett and Harry Hookway did in the preparatory stages. I also hope that the UK will find enough good people to take on its share of contract work, whether the contracts are made direct from Unesco or indirectly through international non-government organizations. How such participation can and should be organized it is still too early to judge, since much depends on how the Unesco secretariat and the proposed steering committee for UNISIST, as and when appointed, decide to operate. One thing is clear, however. It is possible for UK organizations to identify projects which they consider could contribute to the UNISIST programme, as well as satisfy the UK's own needs for information research and experiment, and either finance them from the existing UK sources, where appropriate, or seek support from Unesco. There are already initiatives of this kind—for the serials data system there has been a French initiative, probably known to most of you, and at the recent conference of UNISIST there was a Polish offer to supply buildings and equipment for a course providing education for information specialists. A great deal will depend upon how much money is available from Unesco, both for technical assistance as at present, and for meetings and activities specifically concerned with the project recommendations of the study report. For the biennium 1971/72, I understand, only $180,000 (about £70,000) has been available for meetings and projects, and in 1972 much of the available money went on organizing the October Conference, as a key development in the whole concept of UNISIST. How much more can be spent in 1973/74 will depend upon what share of Unesco vote UNISIST can command, and this in turn will depend on how good a programme of work the Director General can mobilize and present to the general conference of Unesco in exactly a year's time.

3. HERBERT COBLANS, *Managing Editor, Journal of Documentation*

As I think you have already gathered, there are a number of troubles with UNISIST. The main trouble is the name from which it started—the world science information system. There will be no international centre in Paris which will unify, collate, store and disseminate information. The Utopian concept of a world centre conserving all documents, which was common in the eighteenth and also in the nineteenth century, was already hopelessly out of date in the inter-war years. For a short while it was accepted by Unesco in 1948, but it was very soon discarded.

The second difficulty lies in the word 'science'. It arose inevitably from the parentage of UNISIST, with the Department of Natural Science of Unesco as the father and ICSU as the mother. What is pure science? Is it the same as 'Wissenschaft'? It was not realized at the beginning that the value and the interest of UNISIST for developing countries lies much more with applied science. What is immediately essential for developing countries is medicine and agriculture, and that is not pure science, by any means. It implies technology, economic planning and that leads on to sociology and even the humanities.

Rather let us ask what has UNISIST become after four years of travail? A lot of work was done as it was a fair-sized central committee and a large number of people helped by being drawn in on working groups. It is true that we have been criticized for being too narrow and not taking into account every possible vested interest. The first achievement was a modified concept of standardization. The idea arose of co-ordinating what exists and of exploring the minimum areas of co-operation in practice. In standardization a new pragmatic approach was tried. What is the official approach in standardization in documentation? It is to work through ISO, the International Organisation for Standardisation, basically a non-governmental federation of national standardizing bodies, of which the BSI is our very important national representative. But it must be realized that ISO has no executive power at all; it has only advisory functions. It achieves standardization by a long and arduous process of years of argument based on national suggestions and final international agreement. Its work is based on principles. Finally, when there is agreement on all the details, ISO produces not a standard but a recommendation. These recommendations become standards at the moment they are accepted and published by the Member States. We work to BSI standards, because we are in England, but they are the same as people in France work to if they accept the ISO recommendation. Now that can take anything up to twenty years. I have personally participated in the beginning of a recommendation in the early fifties and it has not yet reached the stage of a standard. Now, that is not a criticism, that is a fact of life.

If you really want to approach a thing from first principles and get every country to agree, it takes a great deal of time. The sad thing is that after these twenty years and final agreement, far too few people use the standards. Let me give you a typical example, that of transliteration from Russian, something of great importance in documentation. That recommendation was finally published, but I can assure you that many of us use a different one. Why? Because the original transliteration standard was based on the needs of scholars, who work mainly with printed texts. When they want to transliterate a 'ж' they use 'ž', which any good printer can supply. Those of us who use typewriters, and most report publishing uses typescript as input, want transliteration without diacriticals, i.e. 'zh'. This is an example of how the correct one, because there is a slight difference, is not used much today whereas the more pragmatic one is. I am not saying this is a criticism of ISO: I cite it simply as a problem.

Now, UNISIST approached standardization from the other end. One of the bodies which was a great help to UNISIST, and was only set up at the second meeting, was a so-called Advisory Panel. This Advisory Panel represented the 'big boys', in the sense of the large systems that were actually working and had invested millions of capital, such undertakings as MEDLARS, Euratom, Chemical Abstract Service, BIOSIS, INIS, INSPEC, etc. These are the people that were not just talking; they were producing output. They were all represented on that panel, and they got together and decided what would be a practical minimum of standardization that would be acceptable to each of them, and would involve a minimum of change in their present practice for input. Thus these large bodies would finally be using the same conventions and their systems would be compatible. They have pledged themselves that within two years they would try to make the change. It is change which is not serious, because they all agreed on a change which would mean the minimum amount of alteration of their present practice.

UNISIST has been greatly criticized for this sort of interference. Some representatives of ISO have taken the view that the effect of UNISIST has been to stop international work, to, as it were, throw a spanner in the works, by trying to standardize without going through the normal ISO channels. But I think you will agree with me that this is the only way to get things done quickly. We have not got ten years, not even three years. Systems are growing at such a rate, and if they all grow in different directions we are going to have the terrible problem of trying to merge their products. So, that is one of the achievements and it is not an achievement against ISO (ISO always had representatives at the UNISIST meetings). UNISIST has always understood that they must finally, when there is international agreement, go through the normal ISO channels.

Well, what are some of the other achievements? First of all, the International Serials Data System (ISDS), which has been mentioned already. It will do for periodicals what the Standard Book Number has done for books. That has already started: the International Centre was taken over by France, and it already has its own Director. It has run into some difficulties, partly because of vested interests, but that is inevitable. Then there is the bibliographical standardization of the bibliographic elements, the establishment of what are the essential elements which go into an entry, transliteration, minimum character sets, etc. In order to do this with the money that was available, Unesco gave a contract to INSPEC and I would like to assure you, as Mr Gray has already said, that Great Britain has played a commendable part in this work. INSPEC did the design for the ISDS; it has also done the plan for what is called a Bibliographical Description Reference Manual. This Reference Manual sets out the best practice agreed upon by these large services. The Reference Manual is almost ready and it is going to be tested at the Library School of the University of Sheffield. This should be done within about a year's time. Once it is tested it will then be the manual used by the big centres for input.

Now let me turn to some of the more negative aspects. The main difficulties really arise—and this is inevitable—from the worries which groups of vested interest naturally have. Above all there was the problem of the developing countries. Mr Scott Adams has spoken already about this problem of the infrastructure, the need for a national policy of providing the essential minimum of libraries and documentation centres. There was a clear effort by the developing countries to misinterpret and misunderstand what UNISIST was trying to do. The developing countries see in UNISIST the hope that the gap between them and the developed countries can be narrowed. They realize that they need a lot of money to do this and they hoped that UNISIST would provide some of that money. Now this is moonshine—if I may put it very crudely—because UNISIST has not got money in that sense. The one thing that the big powers, USA, USSR, UK, France, were in entire agreement on was that there should be no extra large sums of money voted. UNISIST would have to work within the framework of present Unesco budgets.

The atmosphere of distrust by the delegates from developing countries can be illustrated by the view expressed by one large South American country at the Conference in Paris last week. It was pointed out that, of the twenty-two recommendations contained in the UNISIST Report, only two refer specifically to developing countries. Well, I need hardly tell you that every one of the other twenty was just as vital for developing countries as the last two.

Finally I come to the criticisms and there are many. Mr Scott Adams organized a meeting of USA leaders in information work under the sponsorship of COSATI at the National Academy of Sciences. I shall quote from a very interesting comment made by Mr J. Sherrod, the Director of the National Agricultural Library: 'What is surprising is that after four years a study of this kind could produce a report that contains so little that is either creative or innovative . . . the study seems to have avoided dealing with the newer forms of scientific communication altogether . . . [it] refer[s] largely to the more formalized and . . . more archaic modes of communication.' Now that sounds like a valid criticism, but I think after what you have heard this morning you will see that it is not really valid. We were concerned not with a technical problem, but with the political problem, the problem of making human beings co-operate in what they are doing already. I have only time for one more quotation from comments made by a distinguished research worker in information science in another context: 'So long as the internal situation in the industrial nations with respect to research development and services in information science is as untidy and complex as it is, an internationalization and superimposition of another level of administration over the existing ones would only magnify the problems on an international basis that now exists nationally.' In other words, we do not know how to behave nationally and it is going to be very much worse when we try to achieve international agreement. Well, you can have your own views about this, but I think I can assure you from a certain experience in international work that very often you can do internationally what you cannot do at the national level.

So, in summary, I would like to say that UNISIST could, for the first time, provide a central steering body capable of evaluating, interpreting, presenting to governments and national bodies, what can be done, what must be done to avoid waste and overlap, to find what the gaps are, to increase efficiency. At present ISO promotes standards—nobody listens; Unesco organizes documentation centres for developing countries—after 5 or 6 years some of them collapse, because the governments do not support them. WHO and FAO have some responsibility for subject documentation, OECD tries to co-ordinate science information policy, ICSU co-ordinates a limited number of abstract services for the pure sciences. FID and IFLA look at the professional aspects of documentation and librarianship. But there is no overall body that has the mandate and the resources to bring these multifarious and complex activities together into some sort of focus, so that they can act on limited agreement. In my view the information chaos from which we suffer today is not due to the so-called literature explosion, but rather to the absence of central guidance and coordination. Let us hope that UNISIST can meet this need.

4. F. W. MATTHEWS, *Head, Central Technical Information Unit, ICI Ltd.*

I should like to give you a little of the atmosphere, the feelings, the response I had to being present at the meeting. I think you will appreciate that I was very much the tyro at this level of operation. I have never before been to an intergovernmental or UN meeting of this kind, and it was quite a revelation.

It started by my arriving in Paris with a three by five inch card, carefully lettered out: 'Place de Fontenoy, Palais Unesco'. I thought that that would get me there, i.e. just showing the card to the taxi driver. However, I soon threw away my three by five inch card, having realized that the next time I would get into a taxi I would not need it: one usually just turns to the driver and says 'Unesco', whereupon there's a smile of immediate recognition on the taxi driver's face. He says, 'Ah, one of those boys. Good for a few extra francs'. Taxi drivers just love Unesco.

In spite of the fact that I was there under the auspices of ICSU, I felt very Canadian, more Canadian than I felt in the two years since I had been in Europe.

This was partly because I knew the Canadians, who were one of the largest delegations there, and they managed to stay unique throughout. Canada was the only country that did not vote for the resolution when the final vote came. The Canadians were unique in that all of them had something directly to do with information. They were not just politicians: the leader of the delegation was the Librarian of the National Library of Canada. I was a little startled when, the first time a Canadian spoke, he spoke in French, and then I realized there is something real happening in Canada as regards bilingualism. They were the only delegates that would alternate between English and French when they were speaking; the translators must have been quite startled to see a man starting to talk in English and then, without a break, begin talking in perfect French. They had done their homework: Canada has spent more money *per capita* trying to find out what it should be doing about information than any other country in the world, and it hasn't all been wasted. They were fairly sure that the size of the structure and the way it was organized were not what they thought they should be. They did not get much support and that accounts perhaps in part for their final vote.

Take for instance the size of the steering committee: the Rapporteur General, in drawing up his recommendations, suggested there should be twelve members on it. Canada, and many of the technologically developed countries, also thought the steering committee should be twelve, but it ended up as twenty-three members—a result to be expected in a one country–one vote system.

What can we, as people who are users of information, designers of systems, expect from all this? I have learned much this morning listening to people who had actually worked for four years on UNISIST. It gave me a new appreciation, and perhaps I am not quite as discouraged as I was when I left the Paris meeting. Looking at the international organizations in this field, we have ICSU, ICSU AB, IFLA, and CODATA, as well as ISO on standards. Why have we set up a new one?

DISCUSSION

MR SHERATON (Ottawa): 'What is the next move?'

MR ADAMS: 'I cannot speak officially, of course, for Unesco. It would seem to me that the next move is obviously to have the Unesco Secretariat prepare a programme which, as Mr Gray has suggested, will be presented to the general conference of Unesco for its approval one year from now. The Division of Scientific Information and Documentation within the Science Sector of Unesco has a modest budget for the present year. This had the promise of some augmentation by the Director-General, so that they will be able to undertake some actions, even before the approval of the total programme by the general conference next year.'

DR CREMER (Chairman): 'Could you add some remarks about the organization of UNISIST, that is, the general conference, steering committee and so on?'

MR ADAMS: 'Yes, in my opinion there is too much of it. The size and character of the organization was one of the issues at stake between the developing countries and the highly industrialized countries (US, USSR, UK, France, Federal Republic of Germany and so forth). The latter wish to keep Unesco's costs down and hence advocate a relatively modest kind of operating machinery for UNISIST. On the other hand, the developing countries want a representation from every corner of the earth. This has resulted in a proposal for a recurring intergovernmental conference to be convened by the Director-General of Unesco at his discretion, presumably every four or five years and this is a rather expensive undertaking. Between conferences there would be a

Steering Committee of between eighteen and twenty-three members. The industrialized countries wished to keep the Steering Committee down in number to not more than a dozen or so. There would also be 'An Advisory Committee of scientists, engineers and information specialists reflecting the interests of both producers and users and those responsible for information transfer to assess periodically the ability of the UNISIST programme to meet the needs of, and provide services to, the world's communities of scientists, engineers and technologists. With all this superstructure there would still be a relatively modest administrative office within the Science Sector of Unesco.'

MR F. LIEBESNY (Transociates Ltd): 'I notice a very large number of abbreviations on the blackboard, but one of them, UNIDO, is missing. I was wondering whether UNIDO was present, as UNIDO seems to represent the interests of those particular countries.'

DR COBLANS: 'Well, first of all, may I just make a slight correction. Scott Adams spoke of the bigger countries that were not present. They were not present as delegates, but they were present as observers. UNIDO was present as an observer—they had three representatives there. Of course the mission and the purpose of UNIDO are much narrower than the developing countries want. They are quite rightly interested in the operation of documentation centres and would like to slot into what is available in the way of duplicate magnetic tapes and other services, which we hope UNISIST can make generally usable by standardization. They would not accept the fact that the basic infrastructure which they need in these developing countries can be met by such international arrangements for administering technical assistance as the UNDP. UNDP works through UNIDO, FAO, Unesco and the others. Each of these bodies has money in its budget to help developing countries. The developing countries made the mistake, as I see it, and I think Scott Adams will bear me out here, of assuming that all their needs in this field could be met by the new UNISIST. They thought of the new UNISIST as a Father Christmas, equipped to give them a lot of money to improve their infrastructure, whereas the whole situation is different. There are a number of big organizations in the world today whose main job it is, and we all contribute towards this, to help developing countries. But this help must be seen to be justified, that is, each project must be looked at properly to see its relation to the needs of the country. In the early days, unfortunate mistakes were made, especially the prestige requests which we have all heard about. For example, a country like 'Argonia' thinks that unless it has an ultra-microscope, it cannot face its confrères in the biological world. Unesco provides the ultra-microscope and I have personally seen this sort of expensive equipment mouldering away in cellars. The country has to make a strong case, and there are many conflicting claims, so some of the developing countries felt that there was a wonderful chance here to short circuit these procedures and to get all they wanted from UNISIST. But UNISIST has no money for this purpose. Its job is to co-ordinate existing activities and in that way indirectly to help every one of us, whether we are developed or still developing.'

MR ADAMS: 'I would like to add a few remarks. As part of the preparation for the UNISIST conference, Unesco convenened a meeting of the United Nations Specialized Agencies, most of which have an interest in administering development funds supplied by UNDP on behalf of developing countries. One of the interesting things that came out of this meeting was a proposal that Unesco should attempt to co-ordinate the information activities which relate to developing countries. If something can come of this, it will be a significant step forward. Many of you are familiar with the Jackson Report on the development support capability of the United Nations system. Chapter 6 bears on information requirements and certainly one of the very fundamental needs we have in this field is to establish adequate information control. At the moment there is no single place to which one can go in order to find out what agency is providing what kind of aid, and how much, in what country, and through what means. Consequently, there are agencies duplicating each other's work. There are great gaps in the area and so I think that some co-ordination would be most helpful.'

MR J. L. HALL (UKAEA, Culham Laboratory): 'There has been much talk about money. I think in common with some people here I need a bench mark on this. Could one of the speakers please tell us what the Unesco budget is at the present time and, if UNISIST became recognized as one of the three or four main missions of Unesco, what proportion of the budget might be available in, say, the middle of this decade?'

MR GRAY: 'I have no knowledge of the total budget of Unesco, except that it is a very large multiple of what UNISIST might reasonably hope to get. There is a comparable programme at the moment in the field of oceanography which is called the International Oceanographic Commission. I understand that the spending money of the Commission has run at around about $350,000 per year. That is the rough order of magnitude and the Central Committee of UNISIST hoped that the UNISIST activity might grow to something around about that level. Whether it will grow to about that level does depend upon what happens at the successive biennial general conferences, and how good a set of ideas the Director-General receives to put up to the Conference.'

DR COBLANS: 'Strictly speaking it is not the budget of Unesco that is relevant here, because it is only one part of the budget of Unesco and it is a question of how much of that budget will contribute towards UNISIST. In the work of the Central Committee there was an attempt, and you will find it in detail in the Report, to work out what it would cost to run such a UNISIST office. The figure given in the full Report (p. 140) is $800,000 in the first few years. But of course this figure was considered to be far too high by the countries who pay the money and that is why it was suggested that, instead of having an Office staffed separately, as the Oceanographic Commission does, it should become part of the Unesco structure. In the various departments of Unesco (Science, Education, Social Sciences, Culture, etc.) documentation activity is going on all the time and the idea is that it should be all combined, so no additional staff would be needed. In that case, a figure of roughly $400,000 might be sufficient to run this office. However, the large countries have said that they will not provide this additional money in the early stages, that Unesco must find help for developing countries elsewhere, and Unesco has broadly agreed to this.'

MR GRAY: 'Just to get one point clear, the figure of $800,000 per year that is in the Study Report for a typical year, did include staff and overheads. The figures normally given by Unesco, including that rough one I gave you for the International Oceanographic Commission, excludes those two items. If you exclude them from the $800,000 in the Study Report, it comes to about $500,000 and that is the figure one should really compare with the the $350,000 allocated to the Oceanographic Commission.'

MR ADAMS: 'I can contribute two other miscellaneous pieces of information here, as bench marks maybe. The first is that the Unesco Department of Documentation, Libraries and Archives has a budget of about $2 million. The second is that, while the UNISIST conference was in session, the Executive Board of Unesco was meeting concurrently. *Le Monde* recently carried a story (8 October 1971) about the financial crisis that Unesco was facing and the Director-General's intention to request the Unesco departments to cut back in their budget requests. The Director-General is understood to be particularly impressed by the warm reception that UNISIST has had from the member countries of Unesco and will probably give it some favoured treatment. Even so, within the total Unesco budget, rising costs have put Unesco, as they have indeed the United Nations itself, in a rather problematic fiscal future.'

MISS P. I. EDWARDS (British Museum, Natural History): 'Am I right in assuming that UNISIST would feel it a responsibility both to support existing information services and also to help with the provision of new services where they could be proved to be needed? In the field of biology, a field which in many ways is the Cinderella of the sciences, there is in the UK a system which is very good and widely used outside, which may flounder through lack of the financial means to become mechanized. I think it could move into the mechanized age if only there were some initial financial support. What help can UNISIST give in such a situation?'

MR GRAY: 'As I understand it, it is not the function of UNISIST to finance either the creation of new services or the extension or improvement of old services, except through technical assistance channels. Its main function is to either stimulate and co-ordinate or take on particular projects which will help those responsible for providing services to improve what they do, particularly by standardizing and working to a common plan.'

DR COBLANS: 'I think I know what Miss Edwards really means. Her national example has broader relevance. Where the national organization is strong, as, say, the American Chemical Society, it negotiates co-operative agreements with Britain, with France, with Germany. But in the biological sciences and in other undeveloped fields (in terms of money spent on information) it may be difficult to get these people together to work out some *modus vivendi*. In fact, it is not always clear what fields are ripe for this sort of co-operation. This is where UNISIST can begin to play a part. But it cannot provide money to shore up biological abstracts—that is not its function. It can assess the need and bring the people together. Unesco has the expertise, the physical and intellectual 'apparatus' to facilitate contact and collaboration. It may not be necessary in the big subjects; it may be necessary in other areas, but we do not even know which areas. It is one of UNISIST's functions to establish what needs there are.'

MR R. J. MOORE (Unilever Research): 'I recall Dr Coblans telling me a few years ago that he had been to a dinner at which the menu was printed entirely in UDC. Can we look forward to an Aslib conference that is conducted entirely in acronyms? I would just like to be quite sure that I know what UNISIST means.'

DR COBLANS. 'The term UNISIST attempts to symbolize the part which the United Nations (UN) should take in promoting a world wide system (SIST) of information both scientific and technical (IST). Now, this is not a true acronym, but let me say this: until we got the acronym UNISIST, nobody would even listen to us—nobody knew us. Once that acronym was invented people started talking about UNISIST. The periodicals started writing about it. So, however wrong it may be, however misleading it may be, let us forget how it was created and what it means. It has now become a concept in the way Unesco is a concept.'

The theoretical foundation of the IDC-system: six postulates for information retrieval

Robert Fugmann

Farbwerke Hoechst AG., vormals Meister
Lucius & Brüning Frankfurt/M.-Hochst

Revised version of a paper presented to delegates visiting IDC, Frankfurt am Main, during the 45th Aslib Annual Conference, Darmstadt, 10th–14th October 1971

Successful delegated searching for publications relevant to the topic of an inquirer obeys rules whose relations to thermodynamics are unmistakable. By the continuous growth of a documentation system in the physical and conceptual respect, steadily increasing demands are made on the degree of order which prevails in the system or can be established at the specific request of an inquirer. If the order in a system cannot keep pace with the increasing requirements, its working capability will continuously decrease, because the searcher is becoming more and more overburdened in relation to his available search time, search patience, and search memory. The degree of order attainable in a growing literature collection can be estimated on the basis of six postulates. The better the requirements imposed by these postulates are approximated in a practical documentation system, the higher are its working capability and life expectancy, but the expenditure to be made on the literature analyses must also inevitably be higher.

The establishment of these postulates originated from practical experience with the IDC-system and its precursors. These postulates form the basis of this system and of its further development.

Introduction

Methods of information retrieval which are in use today or are under development vary greatly in their conceptual basis and in the technical equipment used. Correspondingly large are the differences concerning the performance of the respective documentation systems when confronted with the requirements of practice.

These differences in the performance, however, do not normally occur until after a period of time, when the store of a documentation system has reached a certain size, when new or more specific scientific or technical concepts have been handled in storage and retrieval, and when, finally, the number of search orders has increased notably, as a result of the continuously growing store becoming more and more attractive to the users. This growth of a documentation system in the physical and conceptual respect is an entirely natural and even extremely desirable process in a documentation system designed to serve a substantial number of users and permit retrospective searches in a store covering a fairly long period of time.

It is inherent in scientific documentation that steadily increasing requirements are made on the performance of an operational documentation system. Experience shows that, due to the continuous growth of a system, a discrepancy can very easily develop between the capacity of that system on the one hand and the demands made on it on the other. Many a system has already had to be taken entirely out of commission for this reason, after apparently operating so well in their initial stages and therefore kept operational for some time.

In order to avoid such a failure it is necessary to analyse very carefully the foundations on which a documentation system is to be established and on which it is to grow in the course of time. Only if these foundations have proved to be sufficiently sound is it justifiable to use them as a basis for the later practical documentation work. Therefore, it is very important to be able to foresee what the fate of a documentation system will be and, furthermore, to be able to base such a forecast solely on the premised characteristics of the intended system. One could thus avoid the time-consuming, expensive, and purely empirical approach of putting an intended system into operation and of carefully and solicitously observing what developments the system undergoes during its growth.

Deductions of the aforementioned kind are, however, only possible if a theory exists which correlates the essential characteristics of a documentation system with the behaviour in its growth. It is true that many approaches to such a theory have already been made, particularly with an eye to its outstanding practical importance. But either these approaches have not been sufficiently general or they did not recognize all the essential parameters which can exert an influence on the performance of a documentation system.

As far as the behaviour of a large and continuously growing mechanized documentation system is concerned the IDC (International Documentation in Chemistry) has accumulated extensive experience.[1,2,3] The documentation system of the IDC has been in use in several chemical firms for up to ten years. The magnetic tape store of this system now covers more than 250,000 publications from the scientific and patent literature, apart from the considerable stores of the member firms containing their internal research and development reports. Meanwhile, tens of thousands of mechanized searches of all kinds have been carried out in this store. A multitude of new concepts has meanwhile emerged and incorporated harmoniously into the system of concepts. In spite of this relatively longlasting and vigorous growth, no difficulties have hitherto arisen which might be an obstacle to the practical use of the system or to its continued growth. A large step towards an even accelerated growth has been taken recently by offering the system for use by non-member firms which previously had only a very limited access to the IDC-store.[4]

If one looks back on the development of the IDC-system one must state that it has been influenced by a number of postulates from the very beginning. Initially they were observed intuitively and almost subconsciously. Later they took shape more and more[5] leaning on theoretical considerations in other fields. Today, the make-up of the theoretical foundation of the whole IDC-system, and all the further development work in the IDC, are oriented towards these postulates. Also, the various experiences of the IDC in the documentation of the literature of fields other than that of pure chemistry, were an incentive to formulate these postulates in a general form and to offer them for discussion as a contribution to a general theory of scientific documentation.

Six postulates

The six postulates for information retrieval are as follows:

1. *Postulate of order*: the compilation of relevant literature is an order-creating process.
2. *Postulate of available search capacity*: in searching, disorder can only, to a limited extent, be compensated for by human patience and efforts of memory.
3. *Postulate of sufficient degree of order*: the requirements as to the degree of order rise as the size of the collection and the frequency of searches and the specialization of the inquirer increase.
4. *Postulate of predictability of the mode of expression of stored concepts*: mechanized compilation of relevant literature is based on the predictability of the mode of expression for the stored concepts and for the relations between concepts.
5. *Postulate of undistorted representation of concepts*: high order in the mechanical compilation of relevant literature presupposes undistorted representation of concepts.
6. *Postulate of definability*: only search conditions which are definable can be delegated.

Among the numerous postulates for information retrieval which have been formulated previously in the literature (and which have sometimes been emphatically rejected!) are several of those mentioned above. Therefore each one of those mentioned cannot be regarded as new. Essential to our thesis, however, is the set of exactly these six postulates. Of all approaches to a theory of scientific documentation known to us, particularly of mechanized information retrieval, that of J. Rush and associates[6] comes nearest to ours.

In the following we consider the evidence of our postulates and the way in which they have been approximated in the IDC-system.

1. *Postulate of order*

A literature collection can exist under greatly differing conditions of order, as is indicated in the diagram (Figure 1). Each rectangle denotes a literature collection of a certain size and each point is intended to denote a publication which is relevant to the subject of a particular question. The more distant these points are from each other, the more scattered is the relevant literature and the greater therefore is the disorder in this collection.

The extreme left schematically shows the low order which exists in the literature published purely chronologically, in relation to a question on a particular theme. In order to find relevant matter, the searcher has to go through the entire collection from beginning to end. The last block on the right represents the opposite extreme. All relevant matter is grouped together, without omissions and free from ballast, in a sharply defined place, from where the searcher can take it without any intellectual search effort. Between these two extreme degrees of order there are, of course, all possible intermediate situations.

It is immaterial to our considerations whether such a state of order in a literature collection exists permanently, such as, say, in a book catalogue or in a subject index. It also suffices if such order is always produced only when required, by means of mechanized methods.

The postulate of order appears trivial. Nevertheless its formulation is not superfluous. If, by order, one understands the meaningful proximity of the parts of a whole, one finds today that order as the ultimate aim of documentation work is at times lost sight of. In particular, groupings of documents for documentation purposes have recently been propagated which, to a greater or lesser extent, fail to be meaningful from the viewpoint of the questioner, as demanded in our definition. The outstanding characteristic of such groupings appears to be merely that they can be produced easily and cheaply by computers.

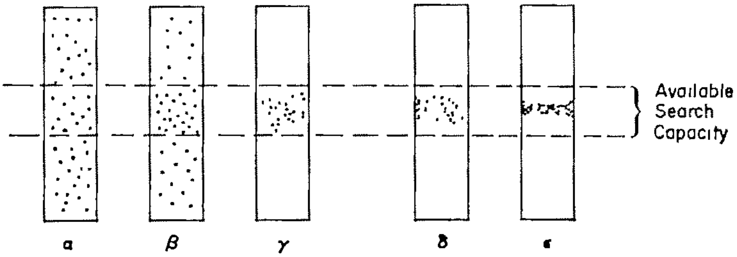


FIG. 1: *Different degrees of order in a literature collection*

2. *Postulate of available search capacity*

Man can overcome disorder through expenditure of time and patience in searching and by efforts of memory. He needs time and patience to search through a disordered collection from beginning to end for matter relevant to his subject. However, everyone only has a certain amount of time, patience and concentration available for searching. The performance of his memory also reaches limits early. He can thus always only overcome disorder to a very limited extent by his own search capacity. From the viewpoint of work psychology, we can regard the disordered area of literature which man can still scrutinize in a single search as an individual parameter which cannot exceed a certain upper limit. For better comprehension, we propose to describe this individual parameter as the 'available search capacity'. It is shown as a narrow horizontal strip in Figure 1.

3. *Postulate of a sufficient degree of order*

Thus, if a disordered literature collection exceeds the size of the available search capacity, man becomes overburdened in searching, and overlooks much relevant matter. This can only be remedied if the relevant publications are no longer so widely scattered but more or less effectively localized in a narrower, defined range. This narrower range must no longer exceed the magnitude of the available search capacity. In other words, a sufficient degree of order must be created.

In the extremely high degree of order, all relevant matter has been collected in a defined place, without omissions and free of ballast. Human search time and memory performance are no longer required at all. However, considerable obstacles must be overcome in creating such high states of order. In physics, several laws have already been discovered which apply in systems of different states of order. Thermodynamics, in particular, deals with the relations between the order in a system of molecules on the one hand, and two other important parameters on the other. One of these parameters is the mechanical work which a thermodynamic system is capable of performing. The greater the molecular order prevailing in the system, the greater is the work which this system can perform externally. The classical example thereof is the mechanical work performed by a steam engine. A completely disordered system, on the other hand, is no longer capable of performing work. It is thermodynamically dead. The other important parameter of the thermodynamic system is the energy which must be expended in order to convert a molecular system into a state of higher order in which it can perform work. The higher the order, the more energy must be expended to reach this state. In other words: the establishment of high degrees of order is *inescapably* associated with a high expenditure of energy. This is a relationship determined by natural laws, which cannot be circumvented.

Now the circumstances in literature collections of different degrees of order are entirely analogous. A literature collection also can be described either as thermodynamically dead, or as capable of performing work, depending on its state of order. In an applied sense, a literature collection is capable of performing work if the information which it contains is easily and completely re-available. The information can then be used for practical research work or can speed up the progress of cognition. This type of capacity to perform work also increases with the degree of order prevailing in the collection, or easily achievable when required. This is because, as the order increases, the facility with which stored information can be made re-available also increases.

On the other hand, defectively ordered collections possess a minimum capacity to perform work, because they can only be induced to perform practical or heuristic work with great effort, by expending much search time, patience in searching and memory effort. A completely disordered literature collection can thus, in an applied sense, be described as thermodynamically dead.

The second important parameter of the thermodynamic system which we have considered also has its analogue in the literature field. The effort needed to create order in a literature collection consists of intellectual and mechanical work. Thermodynamics teaches that this work is the greater, the higher the order which is to be created. We must thus resign ourselves to the fact that collections of a high degree of order also inescapably require a higher expenditure of work than collections in lower states of order. Anything other than this would be a second-kind perpetual motion.

We shall now deal with a collection wherein the degree of order is γ (Figure 2). With a collection of the size we have chosen, man is still just able, as we have already established, to compile all relevant matter through patience and attentiveness in searching and time expended on the search. The individual search capacity which is demanded of him does not exceed his available search capacity.

However, the natural fate of any literature collection is that it grows continuously. If the documentation method according to which the collection is ordered remains unchanged, as is normally the case, the degree of order γ also remains constant.

Now the *required* search capacity also grows proportionately to the growth of the stored information. What cannot, under any circumstances, grow with the size of the store is the *available* search capacity, since the time, patience, and attentiveness which man has available for searching is predetermined by nature and has an upper limit. As the store continues to grow, the *required* search capacity soon exceeds the *available* search capacity. From this point in time onwards, the effectiveness of the documentation system rapidly declines. Much relevant matter is lost because lack of time, patience, and attentiveness prevent it from being examined alongside the voluminous ballast. Expressed in thermodynamic terms, the working capacity of the collection begins to drop from this point in time onwards. This development can easily lead to the collection ultimately being taken entirely or partly out of commission, because the prospect of success in searching has become so low that the enormous time expenditure required can no longer be provided or justified. The collection is then thermodynamically dead. Whilst it still exists, it is hardly capable any longer of performing work for the searcher, in the practical or heuristic sense.

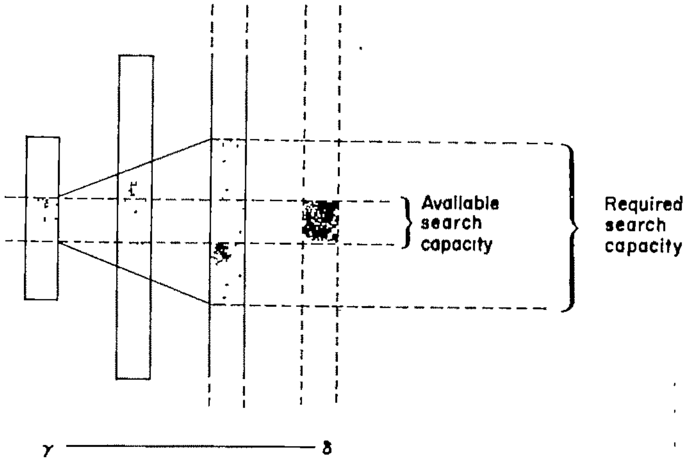


FIG. 2: *Rising demands for order in continued growth of a literature collection*

The peculiarity of this development is that nobody can be blamed for the failure of such a documentation project. All the participating documentation personnel have done their best and merely continued a procedure which initially, and on a small scale, proved entirely satisfactory. This development has frequently occurred in the history of scientific documentation. With many present-day documentation systems it is still in full progress.

This development can only be effectively counteracted by producing, or making possible, very high degrees of order in the early stages of a growing literature collection, namely degrees of order of such a level that they will only be required in the distant future when the store has grown greatly, when the frequency of searches has substantially risen and when the problems posed have become much more specific, in accordance with the general trend towards specialization in science. Thus, with an eye to the future, considerable, hitherto unutilized, reserves of scope for order must be available at all points in time and soon the viability of the system will vitally depend on these reserves. From this viewpoint, a documentation system which has a secure future thus reveals itself to be a surprisingly expensive investment for a far distant future. It demands great entrepreneurial vision.

When the IDC method for the documentation of chemical structural formulae and types of reaction was put into practice in 1960, it had practically utopian reserves in scope for order. These reserves are in part only now being utilized, twelve years later. In years past, there has been no lack of well-intentioned suggestions for working with lesser degrees of order. Undoubtedly, a temporary cost saving would have thereby been achievable. At the same time, however, such a step would also have reduced the reserves of scope of order, to which we have subsequently had to resort in an increasing way, in order to maintain the working capability of our literature collections. Had one taken such a step one would, as it were, have dug the thermodynamic grave for the system.

4. *Postulate of predictability of the mode of expression of stored concepts*

Scientific communication can take place in two basically different ways. In one case one is concerned with the pure communication of experience and discoveries through attentively reading publications, listening to lectures and the like. On the other hand, we find directed retrieval of publications relevant to the subject of an investigation.

In both paths of communication, the language in which the specialist concepts are expressed plays a decisive role. This is because such a language must meet fundamentally different requirements depending on which of the two paths of communication are concerned. This can easily be appreciated from Figure 3. We shall first consider the path of pure communication. Any author or lecturer uses, for this purpose, the natural specialist language and colloquial language. He has a completely free hand as to what mode of expression he chooses in the natural language. The more lively and varied the expressions are that he chooses, the more he stimulates the reader. In such a language there are, for example, numerous possible ways of expressing the concept of corrosion or corrosion protection. However, in each case the reader can deduce, merely from his specialist knowledge, that it is this concept which is meant. The author thus has completely achieved his objective in communication. In each case the expression is given, and the concept is deduced. In other words, the decision as to relevance, that is to say, whether a publication is relevant or not, will thus always be taken only *after* the reader has examined the text, that is to say *a posteriori*.

We now turn to consider the other path of communication, that is to say that relevant publications are to be looked for in a store of information. An important point is that these publications have possibly, and indeed very probably, as yet never been seen by the searcher. He does not even know whether they exist at all. Now it is not the mode of expression which is given and from which the concept can be deduced, but exactly the reverse. It is the concept, namely the subject of the problem posed, which is given, and what is needed is the mode of expression under which this concept may have been stored. Thus, if one faces a store of information the details of which are unknown, and if one is going to retrieve relevant literature from this store, it is necessary to be able to predict by what mode of expression the concepts concerned may have been stored, for example under what heading in an index.

Here one faces a completely different situation from that of informed reading. Here, the decision as to relevance is demanded *before* the text of a publication in question can be examined, that is to say, *a priori*. However, one knows from experience how much more difficult it is to make an *a priori* assessment than an *a posteriori* one. At times, *a priori* assessments are altogether impossible, though the same assessment *a posteriori* presents no difficulties. As an example, one needs only think of the difference between describing prevailing weather conditions *a posteriori* and conversely predicting these weather conditions *a priori*.

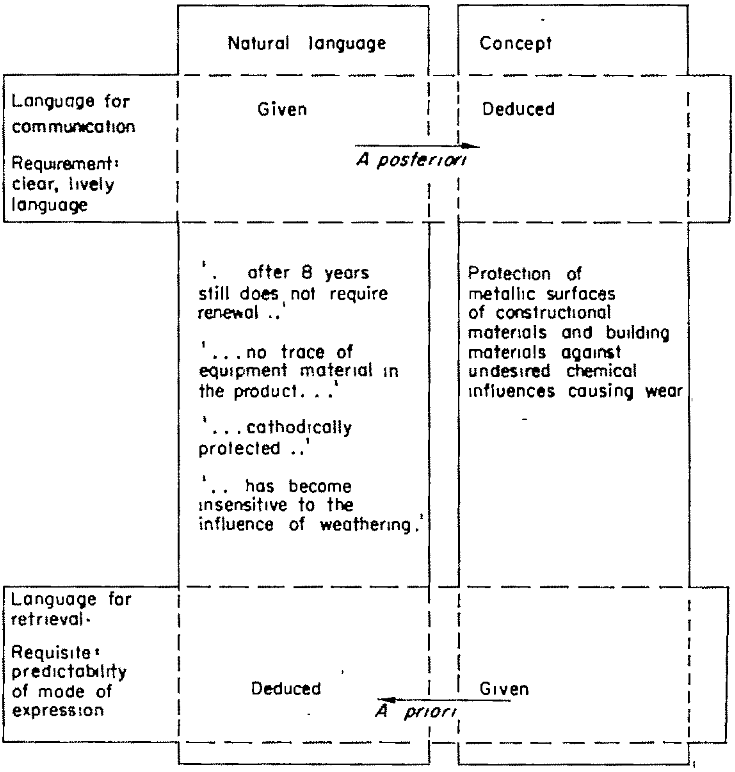

Natural language
Concept
Language for communication
Requirement: clear, lively language
Given
Deduced
A posteriori
'. after 8 years still does not require renewal ..'
'. . . no trace of equipment material in the product. . .'
'. . . cathodically protected ..'
'. . has become insensitive to the influence of weathering.'
Protection of metallic surfaces of constructional materials and building materials against undesired chemical influences causing wear
Language for retrieval:
Requisite: predictability of mode of expression
Deduced
Given
A priori

FIG. 3

Altogether, an event is only predictable if a law is known which describes the occurrence of this event in terms of a known initial situation. However, in natural language we unfortunately do not know any law which an author might follow when choosing expressions for his concepts. On the contrary, the free choice of words is even an important and indispensable characteristic of any natural language.

Thus the situation as regards predictability of the natural mode of expression for concepts is not a happy one. Hence it is also a very inadequate aid for use in retrieving relevant publications from a store, if one has to set high standards as regards the degree of order to be created. What is needed for information retrieval purposes therefore is a different language and the most important characteristic of this language is that its modes of expression are predictable.[7] This can only be an artificial, 'documentary' language which has specially been created for this purpose. By a documentary language we understand a language in which the free choice of the mode of expression is excluded, either in retrieval or additionally in storage, to achieve predictability.

To stay with the example of corrosion, the IDC covers such concepts in such a way that the free choice of words is restricted only during searching. When information is stored, continuous records are kept as to what particular modes of expression for this concept occur and are stored. A thesaurus results, from which one can see what different modes of expression have to be borne in mind for a certain concept when posing a question. In order to rationalize the posing of questions, these original words are subsequently changed into notations. This procedure is applied in the IDC to practically all concepts, apart from chemical structures and reactions.

As regards the last mentioned concepts, the IDC-system restricts the free choice of the mode of expression already at the storage stage. Either chemical structural formulae or types of reaction are translated into the GREMAS language, a highly developed fragmentation code for organic chemical structures and reactions,[2,3] or they are, in certain cases, directly stored as structural formulae drawn in a standardized manner,[8] that is to say, stored topologically.

Topological storage is a process which represents all details of the bonds between atoms in the molecule even more accurately than is expressed by the GREMAS fragment code. On the other hand, the topological representation is not applicable to the majority of general concepts in structural chemistry. Furthermore, posing the question can be extremely expensive in a topological search system. Now, the IDC-system very effectively combines both modes of representing chemical structures as follows:[8] a topologically stored structure is mechanically translated into its GREMAS code by computer. This code is then included in the store of those structures which were not amenable to the topological method and which therefore had to be coded intellectually and directly into GREMAS. This produces a GREMAS store which includes all stored structures. When a question is posed, a search is made in the GREMAS store. This can be done very economically. If, in certain cases, the precision of the GREMAS search does not suffice and topological search conditions appear desirable, then the results of the GREMAS search are reused as some kind of a 'screen'. Only those few structures need be confronted with the topological search conditions, which has already fulfilled the GREMAS search conditions. By greatly restricting the topological search process in this way, topological searching becomes economically acceptable.

5. *Postulate of undistorted representation of concepts*

The fourth postulate amounts to saying that to achieve a high degree of order a documentary language is indispensable, because only such languages provide predictability of the mode of expression for concepts. The artificial languages, large numbers of which have been developed for documentation purposes, vary greatly in their capacity to create order. A primitive documentary language with a small vocabulary, and without any syntax, cannot be expected to have anything like the effectiveness of a highly developed artificial language, which is extremely rich in expressions and fine shades of meaning. The situation can even occur that a primitive, and possibly also an inconsequently applied documentary language, gives worse results in practice than natural language does. This has at times been observed and has now in some places brought any kind of documentary language generally and unjustly into discredit.

A documentary language alone is thus only a necessary but not a sufficient precondition for high degrees of order. We have to formulate yet a fifth postulate, namely that the documentary language should represent concepts with as little distortion as possible. This postulate is undoubtedly the one most difficult to realize. In practice, it is probably only possible to approximate to it. Nevertheless, it is not superfluous to formulate this postulate because it indicates the direction in which all attempts at perfecting a documentary language must aim.

Distortion in translating an intended concept, elementary or composite, into the artificial language can have two different causes, an objective and a subjective one.

The *objective* cause for distortion always arises when the linguistic means of expression in a documentary language are too sparse to represent accurately the conceptual content of the intended concept. As an example, we consider as a composite concept 'A' the '[production] of [amino acids] by [bacteria] starting from [keto acids]'. This concept is characterized by four constituent elementary concepts. If such a composite concept is to be stored or formulated as a search condition, it has to be represented in the documentary language. If this language then lacks the means of accurately representing these four constituent concepts or the particular relation in which these concepts occur in the document, then distortion becomes unavoidable. This distortion may be an inescapable generalization or an inescapable specification. If, for example, the relation of the implied concepts 'substance produced', 'starting material' with the respective chemicals is not preserved, or if these concepts cannot be expressed at all in the documentary language, a concept different from 'A', comprehending a smaller number of conceptual features, is represented. It describes a larger class of subjects than were meant with 'A', e.g. '[bacteria] and [amino acids] and [keto acids]'. Thus, if one wishes to carry out the search with concept 'A', it is necessary in reality to use a more general concept which will include many additional subjects which are not desired. The best result which can still be expected after such a distortion of the search concept is that at least the literature relating to the *undesirably generalized* concept is located properly. The result will unavoidably include ballast, an infallible indication of disorder. It is entirely immaterial what machine is used for the process of ordering and how refined is the programming of this machine. The search instructions to the machine cannot be formulated adequately enough.

A different type of distortion arises if it becomes necessary to include additional unwanted conceptual features, for example, the name of an author, a year, etc., when formulating the search instruction. It is obvious that omissions then become unavoidable because the distorted, undesirably specific search instruction includes a smaller class of subjects than were actually intended by the inquirer. Admittedly, it is possible to attempt to plug these gaps by a large number of alternative searches, e.g. including many names of authors etc., but here again practical and also conceptual reasons soon impose a limit. Disorder is also an inevitable consequence of this type of distortion.

Finally, both ballast and omissions arise simultaneously if a concept is at the same time generalized and made more specific. In extreme cases this can go so far that the formulated search concept hardly retains any similarity to the original question asked.

The documentary languages which are used in the IDC offer practically inexhaustible scope for expression of concepts. For example, the artificial GREMAS language for chemical structures theoretically includes 10^{69} different terms and additionally all can also be combined with one another in any desired way to make up a still much higher number of composite concepts. The vocabulary of the IDC language also has virtually no upper limit for the description of concepts not relating to chemical structure. From an objective viewpoint, this provides the prerequisite for being able to avoid, to the greatest possible extent, distortions in representing concepts.

However, *the mere existence* of such a variety of expressions in itself does not solve everything. It is also necessary to ensure that the person carrying out the translation indeed reliably finds and uses the most appropriate expression for each case, amongst the multitude of acceptable ones, when storing or when searching. This leads us to the *subjective* source of distortions when translating into an artificial language.

For example, a totally inconceivable method of working would be one in which the expressions for the concepts are simply enumerated in a long list through which it is always necessary to scan, in order to eliminate the free choice of words either on storage or when searching.

Such a variety of expressions in a documentary language as that required by the IDC can only be handled by a consistent analytic-synthetic approach. Here, composite concepts of high complexity are described by its constituent, elementary concepts, which result from a conceptual analysis of the composite concept. These elementary concepts can be displayed in a relatively small vocabulary, systematically arranged, much smaller and easier to overview than a vocabulary of the composite concepts would have been. This vocabulary must be systematic in that it should not be a question of memory to know for what concepts there exist terms in the documentary language and where, in the vocabulary, these terms can be looked up. An indispensable device for the purpose of conceptual analysis is that of the ontological category and of logical subdivision of these categories. These requirements have been formulated most explicitly by Ranganathan.

However, when composite concepts are analysed into their elementary constituents, the way in which these constituents were originally connected to one another must be preserved; otherwise, a chaotic conglomerate of elementary concepts results. Subsequently, practically any irrelevant combination could be read into this conglomerate. This would lead to considerable ballast in searching. Thus, if an analytic–synthetic approach is chosen, an efficient tool for representing relations between concepts is essential.

All IDC documentation methods operate consistently in accordance with the analytical–synthetic principle. A good example for the application of this principle is to be found in the topological documentation of structural formulae, a procedure which is in use also at some other documentation institutes. Here, about one hundred terms serve as the vocabulary for the documentation of chemical structural formulae, namely the atoms of the chemical elements from which a structural formula can be composed. If, additionally, all the linkages of these atoms with one another are represented, then this corresponds to a special type of syntax.

In this way one can store an inexhaustible number of chemical structures in a predictable form without always having first to look up the permitted modes of designation in a correspondingly large list.

All other kinds of concepts, also handled by the IDC, are subjected to the analytic–synthetic procedure, too, although here the action of this principle is not as evident as in the field of structural chemistry. For example, the IDC have developed a very general system for representing the synthetic relations of concepts of any kind in a document or in an inquiry. In the 'TOSAR'–system[9] these relations are represented by a topological graph. Each point in such a graph means a certain concept, each connecting line means a certain synthetic (and logical) relation between the concepts. Thus, the whole network of relations between the concepts of a document or of an inquiry is displayed in a lucid and predictable form, and mechanized retrieval of documents, relevant to extended search conditions between the concepts of the inquiry, is made possible.

6. *Postulate of definability*

We have not yet considered the question of the conditions that a publication should satisfy in order to rank as relevant to the inquirer's topic in a delegated literature search.

Reading through documents or abstracts of documents, more or less related to one's field of interest, is a process of continuous learning. Depending on the nature of the documents one encounters, one can continuously vary the scope of a question, purely intuitively and subjectively, and at no point in time during such a search does one find oneself forced to adhere to an *a priori* assessed definition of the search idea, i.e. to a predetermined set of conceptual features that a publication should have in order to rank as relevant. It even frequently happens that the outcome of such a meandering search performed by the inquirer himself is far distant from the original search idea on which he had embarked.

Before delegating a literature search however—and every mechanized literature search is a delegated one—the searcher has to define in advance the set of conceptual features a publication of the desired type should contain to be of interest to him. In other words, one is required to specify the kind of publications in advance which are to be brought together, so that the searcher can then recognize the 'proximity' thus achieved as a 'meaningful' one, as is required by our definition of order as set out in the first postulate above. Every feature on which an inquirer cannot decide in advance must be omitted from the search conditions in a delegated search.

For example, an inquirer should dispense with setting an upper limit for numerical toxicity values when delegating a search for compounds of pharmaceutical interest, although he himself would very attentively look out for the toxicity values in the publications he encounters, when he himself embarked on the search. For the interpretation of published toxicity values depends strongly on the kind of animal used, on its pre-treatment, the route of application, etc. Even if a high toxicity value is reported for a substance of interest, he might not reject such a document, for he might conjecture that in different, 'normal' (!) experimental conditions the toxicity value would range much lower. Obviously it is no way out when, recognizing this difficulty, he writes in his search order, 'with a low toxicity', leaving the subjective decision to the documentalist.

Sometimes the user of a mechanized documentation system bemoans the 'irrelevance' of documents supplied to him as a response to his inquiry, because this kind of document was already known to him. But would he really be able and willing to define comprehensively in advance what he already knows in the field of his inquiry, so that somebody else or even a machine could exclude such material?

The goal of such a truncated inquiry, necessarily restricted to its definable elements, can only be to bring together those publications in which, at the minimum, explicitly or implicitly, the predetermined set of conceptual features occurs, together perhaps with additional features on which the inquirer did not decide in the positive or negative sense. All those publications which fail to fulfil this complete set of search features must then be excluded as irrelevant. Should such a borderline between the relevant and irrelevant material not be drawn, it would be entirely uncertain which and how many features of the inquiry could, then, be regarded as inessential, and therefore dispensable, contrary to the carefully considered decision of the inquirer. Were one to give way to such a, as it were, distortion of the inquiry, one would be drowned in an ocean of responses of a much too general kind, devoid of one or several features of the inquiry. Of course, there is no obstacle to enumerating a group of alternative inquiry features, additional to the essential ones, of which group already only a single one would suffice to render a document relevant.

In the light of the postulate of definability, a variety of inquiries frequently encountered in practice appears suspicious.[cf.10,11] Although entirely common to searches of the self-serving type, they might prove to be unsuited for being handled in a delegated search. 'What chemical alterations reduce the toxicity of substance A?' Can the inquirer really define in advance how marked and how statistically significant the decrease in the toxicity is to be in order to be of interest to him? Are the toxicity values reported for the different, but related, compounds comparable with respect to the kind of animal, pre-treatment, route of application, etc.? How is 'relatedness' defined? How closely related should they be?

Drawing borderlines inevitably gives rise to borderline cases. Thus, when asking for literature on the behaviour of a particular species of beetle when brought into contact with a special chemical, no responses can be expected in a delegated search in which instead of this beetle the notions 'insect' or 'animal' occur. These concepts are more general than the search concept 'beetle', i.e. they comprise a smaller number of conceptual features than required. Should they be of interest too, then the search would have to be adequately generalized.

Doubtlessly, many 'interesting' publications might escape the searcher in drawing such a borderline of relevance. But no system of delegated search can satisfy those demands of an inquirer which he is unable to specify in the definition of his search idea. Thus we have to resign ourselves to the fact that the delegated literature search cannot satisfy all information needs of a scientist. Many an investigation into the performance of a documentation system has suffered from the failure to recognize this and from confusing 'relevance' with 'pertinence'[12] or 'usefulness'.

Conclusion

The claim of these and only these six postulates should not be understood in an imperative sense. Rather, they must only be fulfilled in a perfect manner, if one sets the goal of an ideal system with extremely high precision and recall ratios, an ideal hitherto unachieved. But the less consistently one of our six postulates has been realized in an operational documentation system, the farther distant is it, at the same time, from the ideal, and the more questionable are its performance and viability, particularly in the conditions of continuous growth. This holds especially if a single one or even several of our postulates are entirely neglected.

Nor does our approach yield a concise answer to the frequently raised question whether a certain documentation method is 'possible' or not. One would have to specify, before what degree of order is considered necessary in the system now and in the future, what growth of the system and what frequency and kind of searches must be envisaged. Depending on the answers to these questions (which are still difficult enough to find!) *every* documentation method might possibly be suited to serve a certain purpose, provided the demands made on the performance of the system are low enough. Thus, if our approach can settle the question of the 'possibility' of a certain documentation method, which is frequently a highly controversial one, or if it helps to prevent such questions from being raised at all in such an unreflected form, then another practical value of our postulates becomes apparent.

On the basis of our postulates one can also judge more easily the distance of a certain documentation system, intended or in operation, from the ideal of an extremely high performance than is possible when considering such a system only as an unanalysed, highly complex entity. These postulates also facilitate the design of the theoretical foundations of a system which will then meet at the highest possible probability the present and future requirements in the conditions of its supposed growth.

But much freedom will always remain for the final decision on what particular degree of approximation should be realized between a practical documentation system to be put in operation on the one hand, and the theoretically desirable one on the other. For—and also that is implied by our thesis—the closer this approximation, the inescapably higher is the expenditure to be made on literature- and concept-analyses. These economic considerations will frequently compel a certain distance from the theoretically desirable system, even if the performance and life expectancy of the intended practical system are impaired. However, it means a great difference in practice, whether this distance is calculated in advance with all its inherent consequences or whether it emerges later unexpectedly, to the surprise and disappointment of all people involved. This distance might then easily prove to be of a magnitude which is equal to the entire failure of the system at continued growth. This would mean starting again from scratch with another more effective approach, thus practically abandoning the fruits of years of previous working.

The documentation methods which the IDC uses have been developed largely by IDC or by IDC companies, in part with government financial support, because of their general importance. This development work was necessary because up to now no methods have existed elsewhere which allowed such high degrees of order to be brought into the specialist literature as those required by IDC. Even today, almost one-quarter of the IDC budget is expended on research and the further development of documentation methods. The mental, technical and financial effort to realize such a project through development and practical application is extraordinarily high. For each participant in the IDC, it is, however, quite tolerable, because the expenditure is shared by all the member firms and—in part—by the public. It is our experience that such an expenditure is justified, since only thus is it possible to arrive at documentation systems with an assured future.

Dedication

This publication is dedicated to Professor Dr H. Ruschig at Farbwerke Hoechst AG. on the occasion of his 65th birthday. It was through his encouragement that the author devoted himself to the field of documentation.

Acknowledgement

The author is indebted to many documentalist colleagues, particularly within the IDC firms, for stimulating discussions.

REFERENCES

1 MEYER, ERNST. The IDC-System for chemical documentation. *J. Chem. Doc.*, 9, 1969, p. 109.

2 LOBECK, M. A. Use of the IDC-system. *Angewandte Chemie*, International Edition in English, 9, 1970, p. 576.

3 ROSSLER, SIGRID *and* KOLB, ARTHUR. The GREMAS-system: an integral part of the IDC-system for chemical documentation. *J. Chem. Doc.*, 10, 1970, p. 128.

4 *Nachr. Chem. Tech.*, 19, 15, 1971, p. 276.

5 cf. FUGMANN, ROBERT. *Experiences with a faceted classification in organic chemistry using computers.* Classification Research, Munksgaard, Copenhagen, 1965 (Paper read at the Elsinore Conference on Classification Research, 1964); Theoretical aspects of communication in chemistry. *Angewandte Chemie*, International Edition in English, 9, 1970, p. 555; *Die Wissenschaftliche Dokumentation aus der Perspektive des Forschungsmanagements* (Scientific

documentation from the viewpoint of research management). *Nachr. fur Dokumentation*, 21, 1970, p. 160. English version of the paper is available from the author.

6 LANDRY, BERTRAND C. *and* RUSH, JAMES E. Toward a theory of indexing II. *JASIS*, 21, 1970, p. 358.

7 MILLS, JACK. Progress in Documentation. *J. Doc.*, 26, 1970, p. 123.

8 MEYER, ERNST. Versatile computer techniques for searching by structural formulas, partial structures, and classes of compounds. *Angewandte Chemie*, International Edition in English, 9, 1970, p. 583.

9 FUGMANN, R. *et al.* TOSAR—A topological method for the representation of synthetic and analytic relations of concepts. *Angewandte Chemie*, International Edition in English, 9, 1970, p. 589.

10 O'CONNOR, JOHN. Retrieval of answer-providing documents. *American Documentation*, 19, 1968, p. 381.

11 O'CONNOR, JOHN. Relevance disagreements and unclear request forms. *American Documentation*, 18, 1967, p. 165.

12 REES, ALAN. Semantic factors, role indicators *et alia*. *Aslib Proceedings*, 15, 12, 1963, p. 358.

CURRENT AWARENESS LIST

Recent additions to the Aslib library catalogue are broken down into twelve broad groups, whose coverage is indicated below. These groups are not mutually exclusive but it is hoped that users will find them helpful in scanning for new items of interest.

User Studies
Analyses of information-seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory.

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject Organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies: reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies; directories.

JANET WALKLEY
Librarian

CURRENT AWARENESS LIST

*Items are available in the Aslib Library and may be borrowed unless marked * to indicate reference copies.*

User Studies

FOLOSIREA metodelor de 'marketing' in informarea documentara.
Probleme de Informare si Documentare, vol. 5, no.9, September 1971, p.570–3.
The use of market research in information work.

MEWS, HAZEL
Reader instruction in colleges and universities: an introductory handbook.
London: Bingley, 1972. 0 85157 130 1
111p.

MILL, CHARLOTTE HICKMAN
The Wabash Project: a centrifugal program.
Drexel Library Quarterly, vol.7, no.3 & 4, July & October 1971, p.365–74.
Project to develop library awareness within the instructional framework.

STILLMAN, MARY E.
A program for action.
Drexel Library Quarterly, vol.7, no.3 & 4, July & October 1971, p.375–8.
Program for library instruction.

HACKMAN, MARTHA
Proposal for a program of library instruction.
Drexel Library Quarterly, vol.7, no.3 & 4, July & October 1971, p.299–308.

PALMER, MILLICENT C.
Library instruction at Southern Illinois University, Edwardsville.
Drexel Library Quarterly, vol.7, no.3 & 4, July & October 1971, p.255–76.

WILLIAMSON, JOHN G.
Swarthmore College's 'teaching library' proposals.
Drexel Library Quarterly, vol.7, no.3 & 4, July & October 1971, p.203–15.
Observations and comments.

BECHTEL, JOAN M.
A possible contribution of the library-college idea to modern education.
Drexel Library Quarterly, vol.7, no.3 & 4, July & October 1971, p.189–201.
Criticism and attributes of effective instruction.

MELUM, VERNA V.
1971 survey of library orientation and instruction programs.
Drexel Library Quarterly, vol.7, no.3 & 4, July & October 1971, p.225–53.
Current interest, concepts, new approaches, use of media, research, needs.

BLAKE, FAY M.
The library-college movement.
Drexel Library Quarterly, vol.7 no.3 & 4, July & October 1971, p.175–88.
Experiments, impact and criticism of the movement.

BROWN, HELEN M.
ALA activities to promote better instruction in the use of academic libraries.
Drexel Library Quarterly, vol.7, no.3 & 4, July & October 1971, p.323–61.

HENNING, PATRICIA A.
Council on library resources activities.
Drexel Library Quarterly, vol.7, no.3 & 4, July & October 1971, p.343–5.
Activities in the field of library education.

EVRARD, CONNIE F., *and* WADDINGTON, CHARLES, C.
The undergraduate survey: its role in changing patterns of reference service.
Drexel Library Quarterly, vol.7, no.3 & 4, July & October 1971, p.351–6.
Project at Brown University's Rockefeller Library.

TAYLOR, ROBERT S.
Orienting the library to the user at Hampshire College.
Drexel Library Quarterly, vol.7, no.3 & 4, July & October 1971, p.357–64.
5 year program to develop methods to orient the library to the user.

MARSHALL, A. P.
Library outreach: the program at Eastern Michigan University.
Drexel Library Quarterly, vol.7, no.3 & 4, July & October 1971, p.347–50.
Program concerned with acquainting students with the use of library sources.

MIRWIS, ALLAN
Academic library instruction: a bibliography, 1960–1970.
Drexel Library Quarterly, vol.7, no 3 & 4, July & October 1971, p.327–35.
Periodical articles, research studies and theses, general handbooks and guides, and programmed texts.

KNAPP, PATRICIA B.
Guidelines for bucking the system: a strategy for moving toward the ideal of

the undergraduate library as a teaching instrument.
Drexel Library Quarterly, vol.7, no.3 & 4, July & October 1971, p.217–21.
Part of a paper 'The Library, the Undergraduate and the Teaching Faculty' presented at the Institute on Training for Service in Undergraduate Libraries, San Diego 1970.

KENNEDY, JAMES K., KIRK, THOMAS G., *and* WEAVER, GWENDOLYN A.
Course-related library instruction: a case study of the English and Biology Department at Earlham College.
Drexel Library Quarterly, vol.7, no.3 & 4, July & October 1971, p.277–97.

HOWISON, BEULAH C.
Simulated literature searches.
Drexel Library Quarterly, vol.7, no.3 & 4, July & October 1971, p.309–20.

GOKKEL, H. R. W. *and* MAKKEN, TH.D.
Onderwijs aan studenten in het gebruik van de juridische bibliotheek.
Open, vol.11, no.3, November 1971, p.737–8.
Instruction to students in use of the law library of Groningen University Library.

Communication and Knowledge

KARATU, HAJIME
Information-oriented society and communication.
Dokumentesyon Kenkyu, vol.21, no.11, November 1971, p.355–61.

MARLOTH, HEINZ
Present situation and future trends of industrial documentation.
La Rivista dell'Informazione, vol.2, no.4/5, August/October 1971, p.72–80.
Internal structure of information, users of information, sources of information.

SOKOLOV, A. V. *and* MANKEVICH, A. I.
Informatika v perspektive (k voprosu O klassifikatsii vidov informatsii i sisteme nauk kommunikatsionnogo tsikla).
Nauchno-Tekhnicheskaya Informatsiya, Seriya 2, no.10, 1971, p.5–9.
The future extension of informatics as the science of the principles of the transfer of social information.

DAVID, A.
L'information scientifique et technique: pourquoi? quoi? où? comment?
A.N.R.T. Information et Documentation, no.1, September 1971, p.14–18.
Report of a series of conferences organized in Oslo and Rome, November 1970, by AGARD, on the problems of information supply.

AMADOR, RUI
Documentaçao e empreendimentos.
Cadernos de Biblioteconomia Arquivistica e Documentaçao, vol.8, no.3, July 1971, p.144–7.
Illustrates that a firm's information service has to be scientifically organized to benefit its users.

OBERSCHELP, REINHARD, *and* SCHLEMM-RIECK, MAJA
Organisation in Bibliotheken.
DFW Dokumentation, Information, vol.20, no.1, October/November 1971, p.6–33.
Rational organization in libraries.

FEDERAL LIBRARY COMMITTEE (UNITED STATES)
Proceedings of the Federal Library Committee Meetings, 16th December 1970 and 28th April 1971 on implications to the Federal Library community of the Airlie Conference on Interlibrary Communications and Information Networks, 28th September–2nd October 1970. Washington, D.C.: the Committee *in cooperation with* ERIC Clearinghouse on Library and Information Sciences, 1971.
v, 22p.

ROZENSZTROCH, CLAUDINE *and others*
Le VIe Plan et l'information scientifique et technique.
Documentaliste, vol.8, no.3, September 1971, p.102–6.
How the 6th French National Plan should guide development of scientific and technical information services and, in greater detail, staff problems (functions, training).

NASTA, I.
Importanta evidentelor nationale pentru informarea documentara.
Probleme de Informare si Documentare, vol.5, no.9, September 1971, p.542–6.
The importance of national records of translations, information science materials, films etc. in Romania.

PEIXOTO, JORGE
Sistema mundial de informaçao cientifica. O UNISIST: ea sua reuniao de Paris, Outubro de 1971.
Cadernos de Biblioteconomia Arquivistica e Documentaçao, vol.8, no.5, July 1971, p.113–20.
Purpose of UNISIST and discusses basic 22 items of its programme.

ZAGARI, MARIO
A commitment at national and international level for the development of information science.
La Revista dell' Informazione, vol.2, no.4/5, August/October 1971, p.61–2.
Editorial on UNISIST.

SLOWLY but steadily with information.
Nature, vol.234, no 5327, 3rd December 1971. p.268–9.
Scope and purpose of UNISIST.

OOTUKA, HARVO
UNISIST Conference.
Dokumentêsyon Kenkyu, vol.21, no.9, September 1971, p.285.

Information Processing Systems

BUDDINGTON, WILLIAM S.
Access to information.
In
VOIGT, MELVIN J.
Advances in librarianship, vol.2. 1971, p.1–43.

BRITISH STEEL CORPORATION. General Steels Division. Library and Information Services.
Information dissemination services.
Motherwell: the Services [1971].
1v. (var. pag.)

CLAGUE, P.
INSPEC SDI investigation, 1967–1969.
London: Institution of Electrical Engineers. 1971.
5v. (OSTI report 5102)

MATVEENKO, G. A. *and* KARNAUKHOV, V. N.
Ispol'zovanie universal'noi deyatichnoi klassifikatsii i mezhdunarodnoi palentnoi klassifikatsii v sisteme izbiratel'nogo rasprostroneniya informatsii.
Nauchno-Tekhnicheskaya Informatsiya Seriya 1, no.10, 1971, p.18–19.
Use of UDC and International Patent Classification in an SDI system.

CUTBILL, J. L.
New methods for handling biological information.
Biological Journal of the Linnean Society, vol.3, no.3, September 1971, p.253–60.
Developments in the recording, storage and interrogation of biological data, and predictions of future trends.

BISHOP, DAVID
Control and dissemination of information in medicine.
In
VOIGT, MELVIN J.
Advances in librarianship, vol. 2, 1971, p.45–102.

MILLER, WILLIAM L.
A probabilistic search strategy for MEDLARS.
Journal of Documentation, vol.27, no.4, December 1971, p.254–66.
As an alternative to Boolean logic, each reference may be assigned a score calculated from its index terms and the N highest scoring references in the file retrieval.

LORING, ROY J.
Guidelines for a personal information-retrieval system.
Chemical Engineering, vol.78, no.16, 12th July 1971, p.91–5.
Covers choice of system, processing, retrieval, maintenance and other sources of information.

Language and Indexing

CECCATO, SILVIO
Informatics and linguistics.
La Rivista dell'Informazione, vol.2, no.4/5, August/October 1971, p.90–5.

GINDEN, S. I.
Semantic teksta i razlichnye teorii informatsii.
Nauchno-Tekhnicheskaya Informatsiya, Seriya 2, no.10, 1971, p.10–15.
The interrelations between information theory and linguistic semantics.

NATIONAL CLEARINGHOUSE FOR PERIODICAL TITLE WORD ABBREVIATIONS
Word abbreviation list.
Columbus (Ohio): the Clearinghouse, 1971.
xiii, 42p.
The Clearinghouse was established by the American National Standards Institute. Standards Committee Z39.

GILCHRIST, ALAN
The thesaurus in retrieval.
London: Aslib, 1971. 85142 036 2.
viii, 184p.

BLAGDEN, JOHN
Management information retrieval: a new indexing language. Rev. ed. London: Management Publications for British Institute of Management, 1971. 85118 083 3.
227p.

NOBBS, P. M. *and* VROOM, K. E.
Thesaurus of pulp and paper terms. 2nd ed. Point Claire: Pulp and Paper Research Institute of Canada, 1971.
0–919578–00–4
xviii, 426p.

ATANASIU, PIA, *and* GRECU, NATASHIA
Relații intre descriptori în cadrul unui tezaur.
Studii şi Ceratări de Documentare, vol.13, no.3, September 1971, p.213–24.
Relationships between the key-words of a thesaurus.

[DEFINITION of the intermediate lexicon, outline of the project and future experiments].
Intermediate Lexicon Research Project Information Leaflet, no.1, December 1971.
4p.

CHEMICAL ABSTRACTS SERVICE, Open Forum, 15th, Los Angeles, 1971
Report on the fifteenth Chemical Abstracts Service Open Forum, Los Angeles, California, March 30, 1971. Columbus (Ohio): the Service, 1971.
iii, 20p.

COLLISON, ROBERT
The annals of abstracting, 1665–1970; compiled by members of the first Seminar on Abstracts and Abstracting Services, Graduate School of Library Service, University of California, Los Angeles: California University. Graduate School of Library Service *and* California University. Library. 1971.
v, 54p.

BERZON, V. E.
Ob odnom podkhode k problema automatichneskogo refererovaniya i automaticheskogo sbertyvaniya indeksiruemykh tekstov.
Nauchno-Tekhnicheskaya Informatsiya, Seriya 2, no.10, 1971, p.16–21.
Problems of automatic abstracting and automatic text contraction.

BRITISH STANDARDS INSTITUTION
Specification for the presentation of translations. London: the Institution, 1971.
580 06683 5.
19p. (BS4755: 1971)

KUZ'MIN, YU. G.
O nauchnoi organizatsii truda v sisteme sluzhb nauchno-tekhnicheskogo perevoda.
Nauchno-Tekhnicheskaya Informatsiya, Seriya 1, no.10, 1971, p.20-8.
Scientific organization of work in technical translation services.

Classification and Cataloguing

PALMER, BERNARD I.
Itself an education (six lectures on classification). 2nd ed., containing a continuation by Derek Austin entitled 'Two Steps Forward'. London: the Library Association, 1971. 85365 434 4.
115p.

JARDINE, N. *and* SIBSON, R.
Choice of methods for automatic classification.
Computer Journal, vol.14, no.4, November 1971, p.404–6.
Criteria of adequacy for methods of automatic classification and the consideration of various purposes for which scientists classify.

BRITISH STANDARDS INSTITUTION
Universal decimal classification: English full edition: 4th international edition: UDC 621.5: pneumatic energy, machinery and tools; refrigeration and liquefaction techniques and plant.
London: the Institution, 1971. 580 06938 8.
16p. (BS 1000 [621.5]: 1971; FID publ. no.179).

BRITISH STANDARDS INSTITUTION
Universal decimal classification. English full edition: 4th international edition: UDC 668: various organic chemical industries.
London: the Institution, 1971. 580 06894 3.
26p. (BS 1000 [668]: 1971; FID publ. no.179).

BRITISH STANDARDS INSTITUTION
Universal decimal classification: English full edition: 4th international edition: UDC 79: recreation: entertainment: amusements: pastimes.
London: the Institution. 1971. 580 06982 6.
28p. (BS 1000 [79]: 1971; FID publ. no.179).

LIBRARY of Congress cataloguing in publication program.
Cataloguing Service, no.101, November 1971, p.1–5.
Scope of the CIP and list of publishers joining in the project.

Mechanization

EYRE, JOHN *and* TONKS, PETER
Computers and systems: an introduction for librarians. London: Bingley, 1971.
127p.

MARKUSON, BARBARA EVANS
Progress in Automation.
Australian Library Journal, vol.20, no.9, October 1971, p.12–20.
Discusses the development of MARC, future automation, routine applications of data processing, organizational and cost-benefit factors in U.S. libraries.

WARHEIT, I. A.
When some library systems fail—is it the system, or the librarian?
Wilson Library Bulletin, vol.46, no.1, September 1971, p.52–8.
Pitfalls to watch out for when using computers in libraries.

SCHERER-GOOSSENS, P.
Automatisering in bibliotheek en informatiecentrum.
Open, vol.3, no.10, October 1971, p.625–645.
Possibilities and problems created by the use of electronic data processing tools in libraries.

BONNEY, R. W.
A keyword index file of British book titles.
Computer Journal, vol 14, no.4, November 1971, p.333–37.
The Book Centre's on-line file for matching orders against stock and entering the orders into the computer.

HALM, J. VAN
Op weg naar een geautomatiseerd documentatiesysteem.
Open, vol.11, no.3, November 1971, p.723–32.
Automation in the Central Information Department of the Bronswerk Amersfoort Group of Verenigde Machinefabrieken.

SCHIMPFERMANN, M., *and others*
Automation of information retrieval.
Build International, vol.4, no.5, September/October 1971, p.313–18.
Computerized retrieval by the East German 'Bauselectronic 70' system.

MCCLENAHAN, W. S.
A computer-based information system for the pulp and paper industry.
Tappi, vol 54, no.8, August 1971, p.1256–63.
The system operated by the Institute of Paper Chemistry.

CLOUGH, C. R. *and* BRAMWELL, K. M.
A single computer-based system for both current awareness and retrospective search: operating experience with ASSASSIN.
Journal of Documentation, vol 27, no.4, December 1971, p.243–53.
The system for agricultural information operated by ICI Agricultural Division.

LODDER, N. M.
Preliminary survey of mechanised library and information services in South Africa.
South African Libraries, vol.39, no.2, October 1971, p.106–17.
Covers computerized systems, use of telex and of microforms and centralized storage and ordering.

TEPLITZ, ARTHUR A.
Computer-controlled retrieval: a primer.
Journal of Micrographics, vol.5, no.1, September/October 1971, p.35–40.
The retrieval of individual pages from a collection of microforms by computer intervention.

BOSSEAU, DON L.
The computer in serials processing and control.
In
VOIGT, MELVIN J
Advances in librarianship, vol.2, 1971, p.103–64.

MIKAMI, SHUNJI
The circulation control system by using a small computer.
Dokumentēsyon Kenkyū, vol 21, no.10, October 1971, p.315–28.

BECKER, A. M. *and others*
The computer in library organization.
Sulzer Technical Review, no.2, October 1971, p.123–30.
The SULIS system for information dissemination and the AUTOKAT system for the production of book catalogues

KUZNETSOV, O. A.
O vzaimodeistvii potrebitelya i informatsionnopoiskovoi sistemy.
Nauchno-Tekhnicheskaya Informatsiya, Seriya 2, no.10, 1971, p.7–11.
User-system interaction in on-line computerized information retrieval.

MARCUS, RUDOLPH J., *and* GLOYE, EUGENE E.
Real-time interrogation of chemical data.
Journal of Chemical Documentation, vol.11, no.3, August 1971, p.163–7.
An heuristic research methodology applied to narrative chemical and medical information from the 'Merck Index'.

Subject Organization

KULESHOV, M. M. *and* SHAPIRO, I. I.
Spetsializaeuja i differentsitsiya informatsionnogo obsluzivaniya po chernoi metallurgii.
Nauchno-Tekhnicheskaya Informatsiya, Seriya 1, no.10, 1971, p.12–14.
Specialization and differentiation of the services provided by a ferrous metallurgy information centre.

WHITEHEAD, P. J. P.
Storage and retrieval of information in systematic zoology.
Biological Journal of the Linnean Society, vol.3, no.3, September 1971, p.211–20.
A survey, chiefly historical, of means of tracing information in systematic zoology.

EDWARDS, PHYLLIS I.
Information and data centres in the biological sciences.
Biological Journal of the Linnean Society, vol.3, no.3, September 1971, p.249–51.
Lists 27 centres in Great Britain and the United States.

EGGINS, H. O. W
The Biodeterioration Information Centre specialised information centre.
Biological Journal of the Linnean Society, vol.3, no.3, September 1971, p.245–8.
The functions of specialized information centres and how the B.I.C. illustrates them.

IR for the European community.
Information Retrieval and Library Automation Letter, vol.7, no.6, November 1971, p.1–2.
Brief description of the system operated by the Centre for Information and Documentation and ENDS.

WATTS, CHRISTINE *and* PEACOCK, ALAN
The London Research and Information Register.
Quarterly Bulletin of the Intelligence Unit of the Greater London Council, no.16, September 1971, p.25–34.
The computer-based information service covering local government research.

CAIN, JULIEN
Structure and functions of the Unesco Department of Documentation, Libraries and Archives.
Unesco Bulletin for Libraries. vol.25, no.6 November–December 1971, p.311–7, 331.
Covers studies and achievements in librarianship, documentary work, international bibliographies and new techniques.

PETERS, ALEC *and* MARUTA, TATUO
The capability and activity of science information services department,
Franklyn Institute Research Laboratories.
Dokumentêsyon Kenkyû, vol.21, no.8, August 1971, p.255–66.

KATO, KIYOMI *and* IKEDA, TATSUMASA
Technical Information service activities carried by a small number of the staff members: a case in Nippon Kayaku Takasaki Research Laboratory.
Dokumentêsyon Kenkyû, vol.21, no.8, August 1971, p.247–54.

WHITE, BRENDA
Sourcebook of planning information· a discussion of sources of information for use in urban and regional planning, and in allied fields.
London: Bingley, 1971.
632p.; illus.

DADD, MICHAEL N.
The Zoological Record—current developments.
Biological Journal of the Linnean Society, vol.3, no.3, September 1971, p.291–4.
Steps taken to improve the annual bibliography of zoological literature.

GUREVICH, Z. M.
Obibliografirovanii firmennykh zhurnalov.
Nauchno-Tekhnicheskaya Informatsiya, Seriya 1, no.10, 1971, p.30–4.
The bibliography of house journals in the USSR.

MANKEVICH, A. I.
O tekushchei gosudarstvennoi bibliografii.
Nauchno-Tekhnicheskaya Informatsiya, Seriya 1, no.10, 1971, p.5–6.
Improvements needed in current state bibliography in the USSR.

HOUGHTON, BERNARD, *and* ROWLAND, GLYN
Literature search.
New Library World, vol.73, no.858, December 1971, p.157–8.
Literature search on detergents at the Department of Library and Information Studies at Liverpool Polytechnic.

Reprography

PROUDFOOT, W. B.
Stencil duplicating today: a review.
NRCd Bulletin, vol.5, no.1, Winter 1971/72, p.7–11.
History, present stage and future trends.

CROSS, B. C.
Reprographic equipment at the NLL.
NLL Review, vol.1, no.4, October 1971. p.119–22.
The equipment and procedures adopted by the National Lending Library for production of photocopies and microforms.

BAKER, (G. G.) *and Associates*
A guide to COM in the United Kingdom. 2nd ed.
Guildford: the Company, August 1971
60p.

WILLIAM, BERNARD J. S.
Progress in documentation: micrographics.
Journal of Documentation, vol.27, no.4, December 1971, p.295–304.
Covers recent developments, in particular, micropublishing and computer output microfilm.

VAN AUKEN, JOHN A. *and* VAN AUKEN, RICHARD
Small office microfilm (SOM) Products: a status report.
Journal of Micrographics, vol.5, no.1, September–October 1971, p 5–11.
The present state of provision of microphotographic equipment for individuals.

BRIENS, CATHERINE *and others*
Peut-on changer radicalement les habitudes documentaires d'un chercheur? une expérience de documentation sur microfiches a l'I.N.S.E.R.M.
Bulletin des Bibliothèques de France, vol 16, no.9–10, September–October 1971, p.481–500.
The circulation of journals on microfiche to the widely scattered 100 laboratories of the French Institut National de la Santé et de la Recherche Médicale, and user reactions.

Printing and Publishing

WRIGHT, PATRICIA
Writing to be understood: why use sentences?
Applied Ergonomics, vol.2, December 1971, p.207–9.
Choice of alternatives to prose—e.g. logical trees, tables—for the presentation of technical information.

VEANER, ALLEN B.
Micropublication
In
VOIGT, MELVIN J.
Advances in librarianship, vol.2, 1971, p.165–86.

BRITISH STANDARDS INSTITUTION
Specification for the presentation of biographical information in printed music. London: the Institution, 1971. 580 06673 8. 11p. (BS 4654: 1971)

DAVID A.
Les catalogues de fournisseurs: mode d'exploitation, présentation, en fonction et des exigences commerciales et des exigences de l'information.
A.N.R.T. Information et Documentation, no.1, September 1971, p.3–5.
How to improve trade catalogues, both from suppliers' and users' viewpoints.

DROBINSKAYA, M. N.
Vtoroi aspekt bystrogo chteniya-oformlenie nauchno-tekhnicheskikh izdanii.
Nauchno-Tekhnicheskaya Informatsiya, Seriya 1, no 10, 1971, p.29.
How layout of publications can help rapid reading and indexing.

PORTER, K. I.
B.S. 2509: 1970. A standard for serial publications.
New Zealand Libraries, vol.34, no.5, October 1971, p.193–6.
Specification for the presentation of serial publications, including periodicals.

ROTHMAN, HARRY *and* WOODHEAD, MICHAEL
The use of citation counting to identify research trends.
Journal of Documentation, vol.27, no.4, December 1971, p.287–94.
The investigation of publication patterns and manpower figures in economic entomology to identify research trends.

SCHRADER, DOROTHY M.
Armageddon in international copyright: review of the Berne Convention, the Universal Convention, and the present crisis in international copyright.
In
VOIGT, MELVIN J.
Advances in librarianship, vol.2, 1971, p.305–55.

COPINGER, W. A. *and* SKONE JAMES, F. E.
Copinger and Skone James on Copyright, including international copyright with the statutes and orders relating thereto and forms and precedents.
11th ed., by E. P. Skone James. London: Sweet and Maxwell, 1971. 421 14050 x. xlviii, 920p.

WHITE, SARAH
Campaign for copyrights.
New Scientist, vol.52, no.774, 16th December 1971, p.142.
The problems arising from the USSR's not being party to international copyright conventions.

Administration and Management

SANDISON, A.
Library optimum.
Nature, vol.234, no.5328, 10th December, 1971, p.368–9.
Letter replying to article by B. C. Brookes on a mathematical framework to determine which periodical volumes a library should hold.

LANGEMEIJER, H. C. G.
Waardebepaling van literatuurrecherches.
Open, vol.3, no.10, October 1971, p.651–5.
Evaluation of the cost of literature searching.

HARKNESS, JOHN C.
Technical library organization.
Building, no.47, 19th November 1971, p.150.
Birmingham city Architects' Technical Library organization.

RICHARDSON, A. D.
Hamilton Teachers' College Library.
New Zealand Libraries, vol.34, no.5, October 1971, p.174–81.
Planning and lay-out.

RUDNIK, MARY CHRYSANTHA
What every librarian should know about library technical assistants.
Wilson Library Bulletin, vol.46, no.1, September 1971, p.67–72.
Role, training and status of library technicians.

BENEST, J.
Les salaires des documentalistes en 1970: compte rendu d'enquête.
Documentaliste, vol.8, no.3, September 1971, p.107–20.
Survey of salaries of French information workers.

WOLK, JOHANNES VAN DER
The nature and bibliographical control of re-recorded information.
Unesco Bulletin of Libraries, vol.25, no.6, November–December 1971, p.332–7, 343.
Covers machine-readable, micro and conventional reprints.

MESTERHAZI-NAGY, MATA L.
Procurarea si prelucrarea literaturii de întreprindere.
Probleme de Informare si Documentare, vol.5, no.9, September 1971, p.547–54.
Acquisition and processing of trade literature.

FLINK, JAMES, *and* HØYER, HENRIK
Conservation of water-damaged written documents by freeze-drying.
Nature, vol.234, no.5329, 17th December 1971, p.420.
Letter to *Nature* on paper preservation.

Library Systems

PIROG, WOIJCIECH
Organisation of scientific, technical and economic information in Poland.
La Rivista dell'Informazione, vol.2, no.415, August/October 1971, p.64–71.
Describes organization of CIDNT, CIINTE, and other information organizations.

TEXAS STATE LIBRARY. Field Services and Reference Divisions.
The Texas State Library Communication Network policy and procedure manual. 2nd ed. Austin (Tex.)· the Library, January 1971.
31p. (ED 046 467)

COTTON, G. B., *and others*
Libraries in the north west, by G. B. Cotton, D. H. Varley, and G. R. Cliffe.
Manchester: Library Association. North Western Branch, 1971.
39p. (North Western newsletter no.116)

MCELDOWNEY, W. J.
Survey of university library resources 1971.
New Zealand Libraries, vol.34, no.5, October 1971, p.183–7.
Describes background to the survey and plans that have so far been made.

CORNELIUS, H. F.
Non-book materials and Australian university libraries.
Australian Library Journal, vol.20, no.9, October 1971, p.20–6.
Minimum non-book collections needed to involve a university library more actively in the university's work.

GUTTSMAN, W. L.
New media facilities in American universities and colleges.
Aslib Audio-Visual Group Newsletter, July 1971, p.7–14.
Report of a study tour undertaken in September 1970 by the Librarian University of East Anglia.

SURVEY of college libraries in the United Kingdom 1970.
Library and Information Bulletin, no.15, 1971, p.1–26.
Survey carried out by the Information Bureau of the Library Association.

BRITISH AND IRISH ASSOCIATION OF LAW LIBRARIANS
Report of the Committee on Co-operation.
London: the Association, 1971.
iv, 32p.

Professional Activity

VOIGT, MELVIN J.
Advances in librarianship, vol.2.
New York, London: Seminar Press, 1971.
xi, 377p.

THORNTON, JOHN L. *and* TULLY, R. I. J.
Scientific books, libraries and collectors: a study of bibliography and the book trade in relation to science. 3rd ed.
London: Library Association, 1971. 85365 424 7.
ix, 508p.

CENTRAL YOUTH EMPLOYMENT EXECUTIVE
Library, information and archive work.
7th ed. London: H.M.S O., 1971. 11 360052 6.
36p. (Choice of careers 4)

KLESPER, IRENE
Education and training of information specialists in the Federal Republic of Germany.
La Rivista dell'Informazione, vol.2, no 4/5, August/October 1971, p.105–7.
Describes training of librarians, documentalists and information scientists.

LEBEDEVA, N. F. *and* BYKOVA, N. P.
Advanced training of librarians in the U.S.S.R.
Unesco Bulletin for Libraries, vol.25, no.6, November–December 1971, p.338–43.
The further training of qualified library staff by means of seminars, courses, secondments, practical work and conferences.

AVRAMESCU, AUREL, ATANASIU, PIA, *and* LAZARESCU, GEORGETA
Cercetari în informatica documentară efectuate în cadrul centrului de documentare ştiinţifica al academie R.S. România.

Studii si Cercetari de Documentare, vol.13, no.3, September 1971, p.203–11.
Information Research within the Scientific Documentation Centre of the Academy of Socialist Republic of Romania.

INTERNATIONAL ASSOCIATION OF LAW LIBRARIES
European law libraries guide: prepared . . . under the auspices of the Council of Europe. [London]: Morgan-Grampian, 1971. 900865 75X.
678p.

INSTITUTO BRASILEIRO DE BIBLIOGRAFIA E DOCUMENTAÇAO
Quem é quem na biblioteconomia e documentaçao no Brasil. Rio de Janeiro the Institute, 1971.
544p. (Fontes de Informacao, 5).

UNITED NATIONS. Secretariat.
List of depository libraries receiving United Nations material. [New York]: the Secretariat, 1971.
27p. (ST/LIB/12/Rev. 5)

LIBRARY ASSOCIATION
Libraries in the United Kingdom and the Republic of Ireland: a complete list of public library services and a select list of academic and other library addresses. 4th ed. London: the Association. 1971. 85365–141–8.
[iii], 60, viiip.

ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT
Inventory of major information systems and services in science and technology. Paris: the Organization. 1971.
340p.

EDWARDS, PHYLLIS I.
List of libraries in the field of pure and applied biology.
Biological Journal of the Linnean Society, vol.3, no.3, September 1971, p.173–88.
Covers university and special libraries throughout Great Britain.

MEMBERS' ADVERTISEMENTS

Acceptance of advertisements for publication in Proceedings *does not imply Aslib support for or endorsement of the goods or services advertised.*

Members' advertisement rates: first 15 words (minimum), 50p; 3p for each additional word. 10p if box number required. (No agency discount.) A separate section of these columns is available to non-members at £3 per s.c.i.

Translations services

MEDICAL AND HIGHLY SPECIALIZED SCIENTIFIC TRANSLATIONS. S.M. Bonnekamp, FIL, Member of the Translators' Guild (Med. Science & Lit.), 47 Firs Close, Muswell Hill, London N10. Tel. 01-883 3962 during office hours. After office hours an automatic telephone answering machine will record messages.

BUILDING AND CIVIL ENGINEERING TRANSLATIONS from Russian and German into English. G. L. Cairns, MIL, 19 Kingsley Place, London N6 5EA. Tel. 01-340 8990.

TECHNICAL SWEDISH, DANISH, NORWEGIAN translated by J. T. Craddock, B COM, FIL, Ekard, Ray Park Avenue, Maidenhead, Berks. Maidenhead 24931.

JAPANESE/ENGLISH, RUSSIAN/ENGLISH translations. Chemistry, medicine, biology, zoology. D. A. Fraser, BA, MIL, 22 Gresley Road, London N19 3JZ. Tel: 01-272 5664.

WILFRED E. GOODAY, ARSM, DIC, C.ENG, MIMM, FIL. Member of Translators' Guild, Romanian and French. 161 Rivermead Court, London SW6. RENown 1912.

RUSSIAN / ENGLISH TECHNICAL TRANSLATIONS. Chemical, metallurgical and related subjects. D. E. Hayler, 86 Manton Drive, Luton, LU2 7DL. Tel. Luton 25238.

SCIENTIFIC TRANSLATIONS FROM JAPANESE, CHINESE, RUSSIAN, CZECH and other East and West European languages into English and/or German. A. K. Henn, B SC, 'Glenside', Lower Leigh Rd., Pontnewynydd, Pontypool, Mon. Tel. Pontypool 3689 (after 6 p.m.).

MEDICAL, PHARMACEUTICAL, BIOLOGICAL translations from French, Romanian and Portuguese into English and from English into French and Romanian. Dr J. Jacobson, 94 Temple Fortune Lane, NW11. 01-455 1010.

TECHNICAL TRANSLATIONS from Russian, German and Polish into English. B. Klipstein, BSC(HONS), 1 Glenview Grove, Shipley, Yorkshire. Tel. Shipley 58215.

TECHNICAL AND COMMERCIAL translations from English into Russian. Mrs O. Linsley, 31 Parke Road, Barnes, London SW13. Tel. 01-748 8822.

TECHNICAL TRANSLATIONS from Japanese into English. R. A. Scutt, BA, 48 Somerset Avenue, West Wimbledon, London SW20. Tel. WIMbledon 1713 (01-946 1713).

TECHNICAL OR COMMERCIAL translations into/from English, German, Dutch and French. A. M. H. Speller, FIL, NGV, 6 Lakeside, West Ealing, London W13 8HN. Tel. 01-998 1045.

AUTHORITATIVE TECHNICAL TRANSLATIONS. Spanish, French, Italian, German, Portuguese, camera copy or printed. E. W. Sykes, FIL, 39 West Close, Wembley, Middlesex, HA9 9PJ. Tel. 01-904 4273.

Advisory services

IRAS: A NEW ADVISORY SERVICE. As much or as little advice and assistance as you need—anything from a half-day's talk to a six-month's assignment. Miss Helen Townley, I.R. Advisory Services, 117 Wickham Chase, West Wickham, Kent, BR4 0BQ. 01-777 7560.

For sale

CHEMICAL ABSTRACTS, 1930–55, less indexes 1939/40; *JACS*, 1915–55, less 1926; *IEC*, 1915–55; *Anal. Chem.*, 1929–55. *Discovery*, 1946–64. All bound. Offers to Technical Information Officer, Walpamur Co. Ltd., P.O. Box 37, Darwen, Lancs.

CHEMICAL ABSTRACTS 1939–1969. Volume 33, 1939 to volume 63, 1965, bound with annual indexes. Volume 64, 1966 to volume 71, 1969 not bound but with annual indexes. The un-bound run is complete with the following exceptions: Volume 67 lacks No. 2; volume 71 lacks subject and formula indexes. There are no cumulative indexes. Applications for tender forms should be made to Miss E. H. Phillips, UKAEA, Building RD4, Risley, Warrington, Lancs.

SCIENTIFIC JOURNALS. Various back runs available for disposal, including *Chemical Abstracts* 1926–1969. The Librarian, BFMIRA, Randalls Rd, Leatherhead, Surrey. Leatherhead 76761.

REMINGTON RAND 'Flexoprint' equipment. 66 metal holders plus stationery. Unused. £50 o.n.o. Apply The Librarian, Nature Conservancy, 19 Belgrave Square, London, SW1X 8PY.

SHAPE TECHNICAL CENTRE
THE HAGUE, NETHERLANDS

requires an

Assistant Documentalist

to work in the Documentation Branch of the Services Group. Applicants should have a minimum of two years of experience in technical information work, particularly in the fields of coordinate indexing and literature searching. Relevant professional qualifications in the physical or engineering sciences are highly desirable. Fluent English is essential; some knowledge of French and/or German would be an advantage.

Initial annual gross emoluments for a single person 20,748 Dutch Guilders and for a Head of Household 22,872 Dutch Guilders (including expatriation allowance for non-Dutch nationals). An amount of 1,404 Dutch Guilders per annum per dependent child will also be granted. Total emoluments are tax-free in the Netherlands.

Detailed applications should be sent to:

Personnel Officer, SHAPE Technical Centre,
P.O. Box 174, The Hague, The Netherlands,
by 1st March 1972.

PUBLICATIONS OF THE LITERARY AND LINGUISTIC COMPUTING CENTRE, UNIVERSITY OF CAMBRIDGE

The Computer in Literary and Linguistic Research

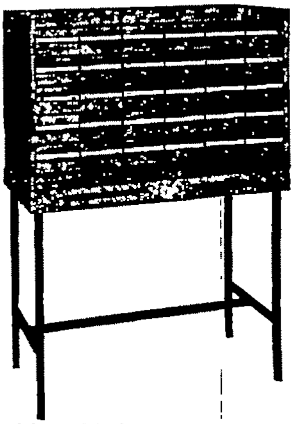
Edited by R. A. WISBEY

A selection of revised versions of papers presented at a symposium held in Cambridge in March, 1970, the first to bring together a large proportion of the U.K. scholars and programmers active in this field and participants from Australia, Canada and the U.S.A. The papers are mainly concerned with work directly relating to literary language.

£6.20 net

CAMBRIDGE UNIVERSITY PRESS

LIBRARY FURNITURE



NO. 126 CARD CABINET ON TYPE E BASE INCORPORATING PULL-OUT FLAPS.

We are able to supply a comprehensive range of card cabinets with any number of drawers.

Catalogue of full range of Library Furniture available on request.

B. Serota Ltd.

Contractors to H.M. Government and Municipal Authorities, Acme Works, Rendlesham Road, Clapton, London, E5 8PS Tel. 01-985 1736/1787

British Technology Index

CURRENT SUBJECT GUIDE TO BRITISH TECHNICAL JOURNALS

FOR TRACING AND RECALL

of $\left\{\begin{array}{l}\text{specific}\\ \text{recent}\end{array}\right\}$ information

in the Field of Applied Science, Engineering and Manufacturing Technology

Monthly Parts and Annual Volume

THE LIBRARY ASSOCIATION

7 Ridgmount St. Store St. London, WC1 7AE

(Phone: 01-636 7543)

STOCK ADULT FICTION

Our new catalogue took months to prepare, and we hope it meets your requirements. The books are reinforced by sewing through the original publishers' cases, so adding greater strength to case and sewing. Then the original publishers' jackets are inserted in plastic sleeves.

If eventually this binding should break down then of course you can always send it to us for re-binding.

CEDRIC CHIVERS LTD
PORTWAY
BATH BA1 3NF **Tel. BATH 23201/3**

First for carpets
Dodson Bull

UP TO 30% DISCOUNT
BRANDED CARPETS

Wilton ● Axminster ● Oriental ● Tufted ● All makes available with full Manufacturers' Guarantees ● NO IMPERFECT GOODS SOLD ● Free delivery in U.K. ● Expert fitting service available most areas.

£200,000 carpets on display
in our extensive London and provincial showrooms
Write stating requirements or for introduction to carpet showrooms in most main cities. Free brochure on request to Dept. ALB

DODSON BULL CARPET CO. LTD
LONDON: 5 & 6, Old Bailey, EC4M 7JD. Tel: 01-248 7971. **BIRMINGHAM:** 164, Edmund St., B3 2HB. Tel: (021)236 5862. **BOURNEMOUTH:** 268, Old Christchurch Rd., BH1 1PH. Tel: 21248. **BRISTOL:** 2-3, Royal London House, Queen Charlotte St., BS1 4EX. Tel: 28857. **LEEDS:** 12, Great George St., LS1 3DW Tel: 41451. **MANCHESTER:** 55-61, Lever St., M1 1DE. Tel: (061) 236 3687/8/9. **NEWCASTLE-upon-TYNE:** 90-92, Pilgrim St., NE1 6SG. Tel: 20321/21428. **WESTCLIFF-on-SEA:** 495, London Rd., SS0 9LG. Tel: Southend 46569.
Open: 9.00-5.30 Mon-Fri. Sat. 9.00-12.00
(Manchester 9.00-4.00)

Books for the Reference Library

GUIDE TO REFERENCE MATERIAL edited by A. J. Walford

Vol. I	Science and technology	£5 (*£4 to L.A. members*)
Vol. II	Social sciences	£5 (*£4 to L.A. members*)
Vol. III	The humanities	£5 (*£4 to L.A. members*)

GUIDE TO CURRENT BRITISH JOURNALS
compiled by David Woodworth £5 (*£4 to L.A. members*)

DIRECTORY OF PUBLISHERS OF BRITISH JOURNALS
compiled by David Woodworth £3.50 (*£2.80 to L.A. members*)

RECOMMENDED BASIC STATISTICAL SOURCES,
2nd ed. £0.25

THE LIBRARY ASSOCIATION

Now . . . an authoritative guide to active, relevant training

THE GUIDE TO SIMULATION GAMES *for* EDUCATION *and* TRAINING

by David W. Zuckerman and Robert E. Horn

- *This single volume gives the training director complete information on over 400 simulation games.*
- *Each game description gives "consumer guide" data on 20 items of information including: roles, number of players, playing time, instructor preparation time, objectives, decisions made, purposes, costs, availability, evaluation.*
- *Complete indexes of the games by title, topic, creator, and producer.*
- *An introduction to the state-of-the-art of the field and annotated bibliography of games and simulation research is also provided.*
- *Careful editorial work has provided an up-to-date, reliable, easy-to-use reference source.*

334 Pages $8\frac{1}{2}'' \times 11''$ *Price £7.50*

available through

Richard S. Gothard & Company Ltd.
(International Technical Booksellers)
GOTHARD HOUSE - HENLEY - OXON, RG9 1AJ - ENGLAND
Telephone: 049 12 3602

15 MAY 1972

NEW FROM GALE
NEW FROM GALE
NEW FROM GALE

CATALOGING, ACQUISITIONS, & REFERENCE TOOLS

LIBRARY OF CONGRESS CLASSIFICATION SCHEDULES: *A Cumulation of Additions and Changes through 1970.* Each of Gale's cumulations brings into a unified sequence all the *supplementary* material for one of the 31 official LC classification schedules. Covered are all additions and changes between the latest edition of each classification schedule and the end of 1970. The cumulations are published in the same units as the schedules themselves; cumulations of supplementary material for individual schedules are available separately. (Write for details on the *annual cumulations,* starting with 1971, of additions and changes to each schedule.) *Sections now in print shipped at once; remainder to be available by Spring, 1972,* total price, **$160.00.**

ENGLISH LANGUAGE BOOKS BY TITLE. The first truly comprehensive bibliography *arranged in title order,* this series provides a greatly needed search alternative to the more common author arrangements. The catalog is based on LC depository cards arranged by title and reproduced in their entirety. Cards included pertain to works completely or principally in the English language, regardless of place of publication. Covering the years 1969 and 1970, the base set consists of more than 160,000 entries in 20 volumes. 1971 and later annual clothbound cumulations will be issued in eight volumes about four months after the close of each year. *Base set ready January, 1972,* **$380.00.** *Annual cumulations,* **$150.00 per year.** *Quarterly cumulations (beginning in 1972),* **$150.00 per year.**

SOMETHING ABOUT THE AUTHOR. *Volume Two. The first volume in this innovative series has been enthusiastically accepted and successfully used by teachers and librarians who deal with young readers. Like the first, the new volume offers a worthwhile reading incentive and a genuine source of student satisfaction.* SATA *furnishes full career and personal data, bibliographies, criticism, and sidelights on about 200 authors and illustrators of juvenile and young adult fiction, nonfiction, poetry, and drama. Printed in 10-point type on no-glare coated paper, the entries are greatly enhanced by large, informal portraits of the subjects and animated illustrations from their works.* Volume 1, ready now; Volume 2, ready January, 1972, ***$15.00 per volume.***

RESEARCH CENTERS DIRECTORY. Fourth Edition. Revised, updated, and expanded by nearly 2,000 entries, the new, Fourth Edition is the only comprehensive guide to nearly 6,500 sources of advanced knowledge in hundreds of fields as represented by current work on campuses and elsewhere throughout the U.S. and Canada. Indexed by name of research center and by sponsoring institution. *New Research Centers* ($50.00 for 2 years, with binder) is a quarterly supplement with cumulative indexes. *Research Centers Directory, Fourth Edition, ready January, 1972,* **$47.50.**

CONTEMPORARY AUTHORS. *Volumes 29-32. With the publication of Volumes 29-32, the* Contemporary Authors *series provides full bio-bibliographical information on 28,000 writers. This new issue contains an index to the entire series. The sketches in all the* CA *volumes are uniform; each presents personal and career facts, a complete bibliography, work in progress, sidelights, and biographical/critical sources. Over 75% of the listings in* CA *cannot be found in any other biographical reference work.* CA 29-32, ready January, 1972, ***$25.00.*** Complete 32-volume set, ***$200.00.***

ORDER AND USE ANY TITLE FREE FOR THIRTY DAYS

GALE RESEARCH COMPANY

BOOK TOWER • DETROIT, MICH. 48226

Published in England by Aslib, 3 Belgrave Square, London SW1X 8PL
Printed by Alden & Mowbray Ltd at the Alden Press, Oxford

Aslib Proceedings

CALCUTTA UNIVERSITY
CENTRAL LIBRARY

incorporating Aslib Information

Printed ephemera in British libraries JOHN E. PEMBERTON 162

Ergonomics and information systems J. G. FOX 178

The London Classification of Business Studies *and management literature* K. D. C. VERNON in association with VALERIE LANG 187

Summary of research undertaken by Aslib, 1966-1971 199

ASLIB · 3 BELGRAVE SQUARE · LONDON SW1

Aslib Proc. vol. 24 no. 3 pp. 151-214 London, March 1972

Claude Gill Books

a five star service to management

★ **Management and Training Centre**
A unique centre displaying over 10,000 titles on all aspects of management. Managers will find its comprehensive coverage meets all their needs.

★ **Mail Order Supply**
An efficient mail order section supplying books by post to customers throughout the world. Expert staff quickly trace current or out-of-print works, whatever the source.

★ **Worldwide Journal Subscriptions**
You can place a subscription with Claude Gill Subscriptions Ltd. for any journal, in any language, published anywhere in the world. Free renewal reminder service avoids interruption of supply.

H.M.S.O. ★ **Publications**
Government reports, bulletins and other publications available direct to visitors or mail order customers from a government publications department located within the Claude Gill showrooms.

'New Books' ★ **Bulletins**
Regular customers receive the monthly Claude Gill 'Management Newsletter' or 'Science Bulletin'.
Listing and describing the most important new books and journals as they appear, these bulletins enable customers to keep up-to-date with latest developments.
Simply write to us if you would like to receive these bulletins for a 3 month trial period.

Claude Gill Books
Management & Training Centre, 481 Oxford St., London W1R 2AQ

Aslib Proceedings

incorporating Aslib Information

VOLUME 24 MARCH 1972 NUMBER 3

© 1972 Aslib and contributors

Aslib Proceedings: incorporating Aslib Information *is published monthly and supplied free to members of Aslib. Subscription rates are £10 annually to non-members, or £2.50 to Aslib members requiring additional copies. Single copies £1, or 25p to members.*

Further information about Aslib's services and membership rates will be supplied on application to the Director, Aslib, 3 Belgrave Square, London SW1X 8PL. Tel. 01-235 5050. Telex 23667; answer-back, Aslib London.

ASLIB CALENDAR 1972

April

THU.6.	Aslib visit to NRLSI, Bayswater Division, W2. 4.30 p.m.
SUN.9–WED.12.	Chemical Group courses: 'Introduction to modern methods of chemical characterization', Kingston Polytechnic, Kingston-upon-Thames; 'Nature and language of Chemistry', Courland Grove Hall, London SW8.
TUE.11.	Aslib Research & Development Department evening meeting: 'Looking at libraries' by Pauline Thomas. Aslib. 5 for 5.30 p.m.
WED.12–FRI.14.	Co-ordinate Indexing Group Annual General Meeting and Conference: 'Words and meanings: the whole problem of the thesaurus for co-ordinate indexing'. Churchill College, Cambridge.
TUE.18.	Midlands Branch evening meeting: 'Current awareness—cost and effectiveness', by A. E. Cawkell. Arden Hotel, Birmingham. 6.15 p.m.
	Transport and Planning Group Annual General Meeting and visit to Hovermarine Transport and Southampton University. Southampton.
WED.19.	Aslib evening meeting: 'Information analysis', by Dr P. Leggate (Oxford University). Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1.
TUE.25.	One-day study session on Europe: 'A guide to economic and business information for the EEC'. Scientific Societies Lecture Room, 23 Savile Row, W1.

May

WED.3.	Computer Information Group evening meeting. Aslib. 5 for 5.30 p.m.

THU.4.–SAT.6.	Northern/Midlands Branch joint conference: 'Services to the information unit.' Derwentwater Hotel, Portinscale, Keswick.
WED.10.	Aslib evening meeting. Speaker: Richard Orr (Director, Institute for Advancement of Medical Communication, USA). Royal Institution of Naval Architects, 10 Upper Belgrave St, SW1.
	Midlands Branch Forum: 'Trade literature'. British Rail Research Department Library, Derby.
MON.15.	Co-ordinate Indexing Group meeting. Aslib. 3.30 p.m.
TUE.16.	Midlands Branch visit to *Birmingham Post and Mail* offices.
MON.22.	Social Sciences Group evening meeting. Aslib. 5 for 5.30 p.m.

June

WED.14.	Aslib Annual General Meeting.
	Sixth Aslib Annual Lecture: Dr B. J. Mason, FRS (Director-General, Meteorological Office) on 'The World Weather Watch: a global system for the collection, communication and processing of weather information'. Royal Aeronautical Society, 4 Hamilton Place, W1.
FRI.16–SUN.18.	Electronics Group 14th annual conference. Civil Service Staff College, Ascot.
WED.21.	One-day symposium: 'Tomorrow's information worker—education and training.' Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1.

July

FRI.14.–SUN.16.	Computer Information Group Conference. University of York.

September

SUN.24–WED.27.	Aslib 46th Annual Conference. Ranmoor House, University of Sheffield.

October

WED.18.	Aslib evening meeting: 'Electronic's Intelligent Machines,' by Dr Igor Aleksander (University of Kent). Royal Institution of Naval Architects, 10 Upper Belgrave St, SW1.

November

TUE.21.	One-day study conference: 'Management in a service context'. 36 George St, Manchester.

ASLIB INFORMATION

Aslib: 50th Anniversary celebrations

Aslib is due to celebrate the 50th anniversary of its foundation in 1974, having been created at Hoddesdon in Hertfordshire in October 1924.

A Committee has been set up under the chairmanship of Sir Alan Wilson, FRS, Chairman of the Glaxo Group and President of Aslib, to plan an appropriate programme of celebrations. The other members of the Committee are Dr J. W. Barrett (Vice-President, Monsanto Chemicals Ltd), Mr H. R. Mathys (Deputy Chairman, Courtaulds Ltd), Lord Shackleton (Leader of the Opposition in the House of Lords), Sir John Wolfenden (Director of the British Museum) and Mr Leslie Wilson (Director of Aslib).

Aslib 46th Annual Conference

The advance programme of Aslib's 46th Annual Conference, to be held in Ranmoor House, University of Sheffield from 24th to 27th September 1972, accompanies this issue of *Proceedings*. It contains details of the programme of sessions and visits, of accommodation and social arrangements, and includes a registration form.

An important feature of this year's Conference will be the exhibition of commercially available information services that will be staged at Ranmoor House during the three days of the meeting. This has enabled the programme to some extent to take the form of a dialogue. The speakers are in general drawn from the users' side of the fence: the services' case—and who shall say the appeal of the eye is not as powerful as that of the word—will be made by the exhibition itself and the opportunity it gives to those providing services to talk to potential users, to discuss their problems and learn from them how their products can be fitted to the clients' needs. Ample discussion time will bring some of these private exchanges into the open. A particularly interesting session will be that in which members present case histories of their experience—happy or otherwise—in the use of external services. If anyone has a story to tell on this theme, it is still not too late to contact the Conference Organizer, Aslib, with a brief synopsis of a twenty-minute paper.

Also from the Conference Organizer, Aslib (3 Belgrave Square, London SW1X 8PL) can be obtained copies of the advance programme and registration form and any other information about attending the Conference.

Scientific Attachés visit Aslib

Scientific Attachés from a number of countries in membership of the Scientific Club of the London Diplomatic Corps visited Aslib on 27th January to discuss Aslib's activities in relation to scientific and technical information. This was a most constructive meeting which will doubtless help to consolidate still further Aslib's position with scientific information interests throughout the world.

Information analysis

'Information analysis' is the title of the paper to be presented by Dr P. Leggate at an Aslib evening meeting to be held on Wednesday, 19th April, 1972 at the Royal Institution of Naval Architects, 10 Upper Belgrave Street, London SW1.

Dr Leggate is Project Leader at the University of Oxford Faculties of Physical and Biological Sciences Experimental Information Unit. This Unit is engaged in the evaluation of several operational current awareness services produced by both computer and manual searching—*ASCA*, *Chemical Titles*, *BA-Previews*, *Index Chemicus Registry System*, and *Scientific Documentation Centre* SDI services.

The objectives of evaluation studies, and theoretical and practical problems of experimental design will be discussed. Particular attention will be given to the choice of performance parameters, and the correlation between quantitative measures (recall, precision, currency etc.) and user reaction as expressed in the replies to questionnaire/interview surveys. Methods for obtaining estimates of recall are described and the significance of 'failure analysis' is examined.

The meeting will be chaired by Mr B. T. Stern, Head of Research Information (Group), Wellcome Foundation Ltd, and will begin at 5.30 p.m. (tea 5.00 p.m.).

Aslib R and D Evening Meetings

Aslib Research and Development Department is planning to hold a series of Evening Meetings at which members of the Department will give informal presentations of the results and findings of projects in which they are currently, or have been recently, involved. The aim of these meetings is to present an opportunity for greater interaction between Aslib members and the R and D Department and to permit the former to comment on and contribute to the investigations in hand and in future work.

The first of these meetings will be held on Tuesday, 11th April at 5.30 p.m. at Aslib headquarters when Pauline Ann Thomas, ALA, MIOM(Dip), will talk on her experiences of 'Looking at libraries'. Miss Thomas writes:

> Work in Aslib Research and Development Department often involves visiting libraries and information services. In studying the use of bibliographic records, or 'forms', in libraries, and now in looking at 'Librarians as Managers', I have been very fortunate in claiming a large share of these visits. The comparative approach to librarianship always appealed to me, and it has been extremely interesting, and educative to meet librarians from all types of library, and to hear something of their experiences and their problems.
>
> It is surprising just how much of what happens in a library involves the use of a form containing a description of a book, from an accession number, to the fullest bibliographic entry in a catalogue. Forms are read, annotated, and passed from procedure to procedure, and file to file in acquiring, processing, and lending books to users. The availability of a centrally produced machine-readable catalogue entry (BNB/MARC) aroused our interest in the present actual use of bibliographic information, and the possibilities of future use of such information, in both manual and computer-based library systems.
>
> We hope the results of this research will be interesting, and useful to practising librarians.

Other R & D Evening Meetings have been provisionally arranged for Tuesday, 6th June, and Tuesday, 12th September.

36th FID Conference and Congress in Budapest

The 36th Conference and International Congress of the International Federation for Documentation (FID) will be held in Budapest from 1st to 13th September 1972. The Conference itself, which will include meetings of the various Study Committees of FID, will take place from 1st to 9th September. This will be followed by the International Congress, which is open to all persons, from 9th to 13th September.

The theme of the Conference is 'Participation of less industrialized countries in world-wide documentation activities and information exchange'. Three sessions have been arranged at which the following topics will be discussed: Session I, 'Review of world-wide and regional documentation activities'; Session II, 'Participation of small and less industrialized countries in international information exchange'; Session III, 'Overcoming barriers in international communication'.

Aslib hopes that, in view of the active part played by the UK in contributing towards the development of the less industrialized countries, there will be a substantial contribution towards the proceedings of the Conference from British interests in the field of documentation and information exchange. Anyone who wishes to present a paper on one of the topics above is asked to contact, in the first instance, the Director of Aslib, 3 Belgrave Square, London, SW1X 8PL.

The attention of readers is also drawn to the International Federation of Library Associations (IFLA) and FID joint seminar on 'Organization of information in less industrialized countries', which is being held in Budapest from 28th August to 9th September.

International Book Year 1972

UK activities

Unesco has designated 1972 as 'International Book Year', with the object of focusing attention on the role of books in society. During this year member states have been invited 'to initiate and carry out programmes of activities designed to promote the writing, production, circulation and distribution of books'.

The Arts and Libraries Branch of the Department of Education and Science has announced that, within International Book Year, the week 4th–11th November 1972 is to be designated in the UK 'National Book Week', during which considerable publicity will be given, both nationally, and locally, to books and their uses.

Local Education Authorities and Public Library Authorities have also been invited to consider what part they can play in these activities and throughout the year in order to enlarge the role and increase the availability of books in their communities.

Exhibition of 'Books about Books'

The Frankfurt Book Fair's contribution to International Book Year will be the First International Exhibition 'Books about Books', which will be held during the Book Fair from 28th September to 3rd October, and also for three weeks during the Unesco General Conference in Paris, where it will be brought to the notice of all 125 member countries of Unesco.

Participation is invited from all publishing houses and organizations concerned with the publication of books or journals dealing with almost any aspect of the book, including Bibliography, Book Production, Library Science, Documentation, Copyright, etc. Aslib hopes to display a number of its publications at the exhibition.

For further information about this exhibition, write to: Exhibition Department, Frankfurt Book Fair, 6000 Frankfurt am Main, Postbox Nr. 3914, W. Germany.

The library resources of Hillingdon

A research study of the total library resources in the London Borough of Hillingdon has commenced at the School of Librarianship, Polytechnic of North London. The project is staffed by a Research Fellow, Barry Totterdell and a Research Assistant, Jean Bird, under the direction of Margaret Whitton, a member of the teaching staff.

It is intended to survey the existing library services and the ways in which they meet expressed needs of users and to consider the roles of the different libraries at the present time with a view to exploring areas of future interaction and development.

For further information contact Margaret Whitton, School of Librarianship, 207–225 Essex Road, London N1 3PN.

Management and special librarianship

The Hertfordshire Association of Special Libraries is holding its first annual conference on Wednesday, 7th June, in the Concorde Lounge, British Aircraft Corporation Sports Club, Bragbury End, Stevenage.

The theme of the conference will be 'Management aspects of special librarianship' and speakers will be Mr T. Corkhill (British Aircraft Corporation) who will discuss 'The contribution of the Library', Mr D. Kennington (GLC) who will put the question 'Can we manage our libraries?', and Mr J. Martyn (Aslib Research and Development Department) who will consider 'Cost benefit and libraries'. The Chairman will be Mr L. J. Anthony (Assistant Director (Services), Aslib).

The Conference fee is £2.50 and non-member librarians, information officers and managers are also welcome. Further details are obtainable from Mrs G. Scott, Assistant Librarian, British Aircraft Corporation, Gunnelswood Road, Stevenage, Herts.

Documentation of the UN and other IGOs

The UN Institute for Training and Research (UNITAR), in co-operation with the Association of International Libraries (AIL), FID and IFLA, is organizing an International Symposium on Documentation of the United Nations and other Intergovernmental Organizations, to be held in Geneva from 21st to 23rd August 1972.

Subjects to be discussed will include the following: Sources of international documentation (production, diffusion, bibliographical tools for their identification); Acquisition and organization of international documentation (selection and ordering, reception and storage, indexing and cataloguing); and utilization (bibliographical control, reference, special subjects).

It is the intention that the participants should make practical suggestions to be addressed to international organizations, to simplify, improve and co-ordinate the present system of production, distribution, organization and consultation of their publications. Participants will include both specialists of international documentation and its users.

The conference fee is Sw.Fr. 40. Applications should be sent by 31st March to the Symposium Secretary, Mr G. Gribaudo, UNITAR Office, Palais des Nations, CH 1211 Geneva, Switzerland.

Data base of world abstracting/indexing services

The International Federation for Documentation (FID) has announced that, now that the preparatory phase for a joint project of the FID and the US National Federation of Science Abstracting and Indexing Services (NFSAIS) to develop a World Inventory of Abstracting and Indexing Services in machine-readable form is completed, the FID, in close collaboration with the NFSAIS, will collect all information available on abstracting and indexing services throughout the world.

The purpose of the joint project, which will be developed over the next two years, is to establish a Data Base of World Abstracting and Indexing Services, one master file of which will be kept in Europe (at FID), the other in the United States (at NFSAIS). Further plans include the continuous updating of the master file with the latest available information on secondary services and evaluation of special services. A by-product will be a directory of world abstracting and indexing services.

ASIS Mid-Year Conference

The First Mid-Year Regional Conference of the American Society for Information Science (ASIS) will be held from 19th to 21st May 1972, at the Kennedy Memorial Union on the University of Dayton campus, Dayton, Ohio. The conference theme is 'Cost reduction of information systems' and will focus on the area of input cost reduction.

In keeping with this theme there will be a low registration fee (about $25), low accommodation rates (up to $7.50 per night) and low food costs ($3 a day). Further information is available from Robert McAfee, jr., ASIS, 1140 Connecticut Avenue, NW, Washington, DC, 20036.

Standard for typographic measurement

A system employing the conventional millimetric scale for typographic measurement is described in a recent British Standard, BS 4786 *Metric typographic measurement*. It is hoped that, since no other country has a system of typographic measurement based on the metre, then this system could be adopted internationally. Proposals to this effect have already been put forward to the International Organization for Standardization by the BSI, which has the support in this move of the British Federation of Master Printers and the International

Council of Graphical Design Associations (who urged the introduction of a new system in 1966).

The Standard recommends a basic unit of 0.5 mm having 20 sub-multiples of 0.025 mm for calculation of character width, the expression of line length in millimetres, and interlinear spacing in multiples of 0.25 mm. The old system of measurement using 'points' and 'picas' would thus no longer be used.

BS 4786 is available from BSI Sales Branch, 101 Pentonville Road, London, N1 9ND.

Chemical Abstracts Service

We have been asked to point out that the UK distributors for Chemical Abstracts Service of Columbus, Ohio, are: (a) The United Kingdom Chemical Information Service (The University, Nottingham NG7 2RD) for tapes and microfilms; and (b) The Chemical Society (Blackhorse Road, Letchworth, Herts) for printed publications, including the latest CAS journal, *Chemical Industry Notes* (see *Aslib Proceedings*, January 1972, p. 7). All enquiries from the UK concerning these CAS products should be directed to the respective UK addresses.

President of the LA

Dr Donald Urquhart, CBE, BSc, FLA, who will be well-known to many Aslib members, was recently installed as this year's President of the Library Association. Dr Urquhart has been Director of the National Lending Library for Science and Technology since it was opened in 1962. He has been concerned during his career with a number of international activities dealing with scientific and technical information.

BRIEF REVIEWS

BOTTLE, R. T. *and* WYATT, H. V. *eds*. The use of biological literature. 2nd edition. London: Butterworths, 1971. 379 pp. £6.00. (ISBN 0 408 38411 5)

The guide, intended for librarians, information officers and biologists at graduate and more advanced level, helps the reader to understand and make better use of libraries and sources of biological information.

The second edition has been completely rewritten and enlarged, taking into consideration the numerous changes in sources of biological information that have occurred in the last few years. There are new chapters on experimental aspects of botany, ecology, genetics and teaching and laboratories. The contents have been arranged in a far more helpful and logical order; library use, primary, secondary and tertiary sources and both specific and general subject sources. The guide concludes with a set of fourteen exercises to test the ability of the biologist in answering the various types of literature problems that he is likely to encounter during the course of his work.

A new feature of the second edition is the section on computer tapes and services for the biologist, that have developed so considerably since the first edition of the book was published in 1966.

This book is a comprehensive and invaluable guide to the sources of information in the biological sciences.

DICTIONARY OF SCIENCE AND TECHNOLOGY. Edited by T. C. Collocott. Edinburgh: Chambers, 1971. 1328 pp. £6.50. (ISBN 0 550 13202 3)

This publication is the successor to *Chambers's Technical Dictionary* the contents of which have been considerably revised in compiling this new publication, which includes approximately 10,000 new terms, together with an updating of the 60,000 or so terms previously included. The overall format remains essentially unchanged.

Terms are assigned to one or more of a hundred broad subject headings, facilitating extraction of a required definition; for example 'plasma' has four definitions, one for each of the fields of mineralogy, electronics, physics and physiology. There are also a considerable number of double terms included: for example, both 'redundancy' and 'redundancy rate' are defined.

The additional tables, listing chemical elements, type of rocks and structure of the plant and animal kingdoms have been retained and tables of SI units and conversion factors prove a welcome addition.

Inevitably the technologist cannot hope to find listed every term in his specialist field, but in a broader context this publication should prove very useful, while the terminology of the definitions is in a form acceptable to the layman.

HARVEY, JOAN M. Statistics Europe sources for market research. 2nd edition, revised and enlarged. Beckenham (Kent): CBD Research, 1972. 255 pp. £5.00. (SBN 900246 09 X)

With the increasing demand for market research in all fields comes an equivalent demand for statistics in more areas and in more detail than ever before. Once again a CBD publication provides a usable guide to this kind of information.

It is now four years since the first edition of this guide to European statistical sources for market research was published; as well as bringing the information in that book up to date, this volume gives details of many new titles, especially those issued by non-official bodies. The main difference in the layout of the information is that in the new edition all the entries, whether for an organization or a publication, have been allotted running reference numbers. This is a much more intelligible means of distinguishing entries than the three-faceted code numbers used in the first edition. Also, the second edition is paginated throughout, whereas in the previous edition text pages were not numbered. Another more minor difference is that abbreviations are now used for the languages in which the publications appear.

Otherwise the format is similar: the same classification of major statistical publications into groups is used: general; industrial and agricultural production; foreign trade, internal distribution. population; and standard of living. The main body of the guide is again arranged by countries in alphabetical order, and the same information is given for each entry, including details of the central statistical office of the country and of other important statistics-producing organizations, principal libraries where collections of statistical material may be consulted by the public in various parts of the world, the principal bibliographies of statistics, and details of the major statistical publications.

A publication such as this is a welcome addition to the current reference books used by many librarians and information officers in business and industry, as well as by market researchers.

NATIONAL REPROGRAPHIC CENTRE FOR DOCUMENTATION. Directory of commercial microfilm services in the United Kingdom. 2nd edition. Hatfield: NRCd, 1971. 11pp. £0.75 (£0.50 to NRCd subscribers). (SBN 85267 032 X)

This second edition which replaces that published in 1969 contains details of—to quote the introduction—'all organizations possessing microform facilities which are made regularly available on a commercial service basis'. Forty-five organizations are fully recorded, and the addresses are provided of eight others who, though believed to offer services, had not supplied data by the time the *Directory* went to press. In comparison, thirty-two organizations were covered by the earlier edition.

The first part of the *Directory* tabulates facilities offered by each organization, covering types of originals accepted, microrecording facilities, Computer-Output-Microfilm (COM) devices, processing, unitizing, microduplicating and print-out facilities available and consultancy services offered. Reference to the alphabetical list of organizations in the second part of the *Directory* then supplies: (1) the organization's address and telephone number; (2) the name of the member of staff responsible for service work; (3) elaboration, if needed, of the details given in the table plus information on other reprographic services offered by the organization.

PEMBERTON, JOHN. The national provision of printed ephemera in the social sciences. Warwick: the University, 1971. 56 pp. £0.50. (SBN 903220 00 8)

The report was prepared for the Social Science and Government Committee of the Social Science Research Council to investigate complaints about lack of social science research materials. Results were obtained through interviews, questionnaires and by looking at existing collections. [Mr. Pemberton's paper to the Aslib Social Sciences Group on this subject appears as the first article in this issue.]

The holdings of six national and university copyright libraries are considered first, since legal deposit may well be the most significant factor in future acquisition of ephemera in the field. The principal types of library used by social scientists (university, research institute, government department, specialist and public) are considered individually from the viewpoints of existing collections, current acquisition policies and the factors affecting demand for the literature. Next, problems of obtaining foreign ephemera and the merits of centralized co-operative acquisition schemes are discussed. The question of central versus specialized collections is examined, leading on to possibilities of utilizing all available resources through a system cf co-ordination and referral based on a national register of collections.

The need for further research into social science documentation is stated and recommendations are made towards a goal of achieving adequate provision of and access to foreign and British printed ephemera in the social sciences.

WHO'S WHO OF BRITISH SCIENTISTS 1971/72. London: Longmans, 1971. 1022 pp. £15.00. (ISBN 0 582 11460 0)

This is the second edition of this directory to appear under this title. The format is the same as in the 1969–70 edition. Inclusion is by invitation only and the information given is provided by the scientists who complete a questionnaire. Those qualified in such subjects as medicine or veterinary science are only included in exceptional circumstances as it is considered that other directories cover these subjects adequately.

Over 8,000 scientists are listed: the entry for each one usually includes full name, date of birth, degrees and awards, past and present appointments, publications, address etc. The directory is alphabetical by name of scientist and there are also lists of abbreviations used, scientific societies, scientific periodicals and research establishments. There is a broad subject index of the scientists' interests.

This is an extremely useful publication but it is doubtful if a complete new edition is necessary so soon. A supplement would probably be sufficient at this date as many of the entries are the same as in the 1969–70 edition.

Printed ephemera in British libraries

John E. Pemberton
University of Warwick Library

Paper presented at a meeting of the Aslib Social Sciences Group, 13th December 1971

IN JANUARY of this year I was engaged by the Social Science and Government Committee of the Social Science Research Council 'to carry out a broad review of the present position regarding the provision of printed ephemera in the social sciences in national, university, public and specialist libraries in Great Britain'. In this paper I should like to give an account of some of the more important findings of my research and to offer for discussion a number of recommendations designed to rationalize the acquisition of these important primary sources, to improve access to them, to provide an effective means of acquainting researchers with their existence and location, and to ensure that future library policies are compatible with the known and potential needs of social scientists.*

The purpose of the investigation was to obtain at first hand a body of evidence against which complaints by researchers about the lack of primary research materials could be assessed and upon which it might be possible to base a national policy for the improved provision of such materials.

In all, I visited fifty-seven libraries and corresponded with a further twenty-one. These were made up of the five national libraries and the Agent for the Copyright Libraries, forty-three universities, eleven research institutes, twelve specialist libraries and six of the larger municipal libraries. What I set out to discover from each was: (a) what collections of printed ephemera it possessed; (b) its present policy for acquisition and disposal of those materials; and (c) suggestions as to how, if considered necessary, national provision of them could be improved. In addition to interviews and correspondence I read the relevant memoranda submitted to the National Libraries Committee, a number of journal articles, papers to conferences and committees, and various other documents.

As regards definitions, ephemera may be defined as documents which have been produced in connection with a particular event or item of current interest and which are not intended to survive the topicality of their message. 'Printed' is taken to include any form of non-manuscript reproduction. The investigation was concerned with materials which could be used for research by social scientists. This could be interpreted to include such things as cloakroom tickets at one extreme, and perhaps patent specifications at the other. In order, therefore, to minimize the risk of misunderstanding and misinterpretation, a list of types of materials was shown to all those from whom information was solicited.

---

* The full text of Mr Pemberton's report to the Social Science Research Council is published as: *The National Provision of Printed Ephemera in the Social Sciences*, by John E. Pemberton, University of Warwick Library (Occasional Publications, No. 1), 1971, 56pp., £0.50, SBN 903220 00 8; and is available from The Librarian, University of Warwick, Coventry CV4 7AL.

Specifically excluded from the investigation were regularly published official publications and manuscript material.

Perhaps I could start with a comment on legal deposit. The workings of the Copyright Acts have undoubtedly ensured that a substantial quantity of printed ephemeral material has been preserved in the deposit libraries. Nonetheless, the libraries concerned agree that a good deal of literature of this kind to which they are entitled is not received. A 'fair amount' of ephemera which the British Museum Library is entitled to receive fails to arrive automatically, and the Copyright Receipt Office is only able to pursue it on a spasmodic basis as time and staff allow. Recently, for example, they made a special effort to collect trade union literature and achieved a reasonable measure of success, but the exercise was not as exhaustive as the Office would have wished. The policy of the Agent for the Copyright Libraries is dictated by the four libraries for which he acts, namely Oxford and Cambridge Universities, the National Library of Scotland and Trinity College Dublin. As regards ephemera they have, in fact, no stated policy and the Agent is generally not asked to pursue those items which do not arrive spontaneously. From time to time one or more of the libraries have requested specific pieces of ephemera, and in some instances this has resulted in the opening up of regular supplies from the organizations which have been approached. Against this, the four libraries also refuse ephemeral material which is offered to them. The agent's view, like that of the BML, is that a 'fair amount' of ephemera is not received simply because it has never been requested. A further quantity of literature is not received by the copyright libraries because those producing it claim that it is for internal circulation only and therefore falls outside the provisions of the Copyright Act.

Turning to the national libraries themselves and starting with the British Museum, one can do no more at present than support the view that it will be impossible to say how wealthy the BML is in social science ephemera until it is assembled in one collection, instead of being scattered throughout the Museum, and to agree that it is likely to prove unexpectedly strong, if only through the operations of the Copyright Act and through the Museum's exchanges with other libraries.[1] It is acknowledged that the BML has not taken a very positive attitude to the acquisition of ephemera in the past. They accepted what came but did not actively seek to acquire material which from the point of view of the legal interpretation of the Copyright Act may not have been 'published'.[2] Current policy still relies heavily on legal deposit and donations, though there are indications that a more active policy is developing. It is recognized that much more could be done and I understand that an acquisitions officer has now been appointed for the 'near Copyright' field. As regards foreign material the present book selection policy at the BML tends to exclude ephemera. Book selectors are organized on an area, not subject, basis and rely in the main on bibliographies and supplementary lists which generally ignore non-conventional material. They are, in any case, mainly people trained in the humanities.

At the National Central Library, since demand is for individual, identifiable items, ephemera is generally excluded from its stock. The only exceptions are pamphlets which are received mainly as gifts, usually already bound into volumes, and therefore dealt with as books. A major factor which deters the NCL from collecting ephemera is the lack of ready-made bibliographical control in the form of bibliographies and check-lists.

The National Lending Library's acquisitions policy is widely interpreted: any social science document which is a serial or is in a numbered series is considered to fall within its scope. The Library therefore has the potential to collect, for example, the annual reports and newsletters of trade unions and such of their pamphlets as form part of a series. There is, however, no indication at present that it intends to collect these materials in a large-scale, systematic way. Fugitive material—miscellaneous pamphlets, leaflets, handbills, posters, etc.—would not be taken because there is no available bibliographic control, and the NLL does not see it as its duty to list and index.

Understandably, the strength of the National Library of Scotland's holdings of ephemera lies in material relating to all aspects of Scottish life. It has, for instance, collections of Scottish church, school and house magazines, and of Scottish local authority papers, including minutes of meetings, reports of chief constables and valuation rolls. It has Scottish political party and trade union ephemera and takes cuttings systematically from *The Scotsman*, *The Times*, and *The Guardian* of items of local geographical and economic interest. Aside from this 'national' material and the ephemera it receives under copyright legislation, the NLS's current acquisitions policy with regard to primary materials 'could probably be described as being not of *active* collection'.

A good deal of ephemeral material is received in the National Library of Wales: political party pamphlets, specialist newspapers, publications of BBC Cymru, and so forth. However, no strenuous attempt is made to pursue this material: reliance is placed on unsolicited copyright receipts and donations. Over the years the NLW has acquired a number of special collections which include some printed ephemera, for example, the Robert Owen collection and the Plaid Cymru collection. The Library used to subscribe to a press cutting service and has a collection of pre-1940 cuttings mainly of Welsh biography; the staff are now working on a card index to newspapers instead.

Next we can look at university libraries. Given the considerable growth in social studies in British universities in recent years there is remarkably little evidence of a parallel growth in research collections in their libraries. Most of the significant collections of ephemera have been acquired ready-made. They include the archival records of local institutions and the papers and collections of individuals. Notable exceptions are the collections of African materials made jointly by academics and librarians under the Scolma scheme, and of Latin American materials made under the Parry scheme. Substantial collections of ephemera assembled by university libraries in support of particular research programmes are not very numerous. But there do exist instances of an attempt to provide documentary support both for research and for teaching by means of primary sources by one or two libraries. Sussex, for example, has a Documents Collection which includes material on the Paris Commune, on India, on European politics and trade unions; and Warwick has an extensive Reports and Statistics Collection which has particularly strong sections on British political parties and on post-war French elections and referenda. The British Library of Political and Economic Science is, of course, a unique case. Since its inception in 1896 it has collected the literature of political parties, pressure groups, industrial and labour unions and so forth from all over the world. With the possible exception of the British Museum Library it is the richest source of non-official social science material in Great Britain. The larger universities contain valuable ephemera as part of their normal stocks, but since they have not been given special treatment they may easily be overlooked by researchers. Often they have been accorded very general headings in the catalogues and are therefore not generally known. With very few exceptions university libraries have no clear acquisitions policy for printed ephemera in the social sciences: at best their policy is a passive one of accepting some of the material which happens to come their way. These are some typical statements which were received:

1. 'A negative policy, except in the case of microfilmed material and reprint collections.'
2. 'No policy, except to keep all material offered in case of future need.'
3. 'No systematic policy.'
4. 'Policy of non-acquisition.'
5. 'No considered policy.'
6. 'No definite policy at present.'
7. 'As yet no policy exists.'

Some libraries, while having no policy to assemble collections of ephemera, were prepared to obtain specific items for which there was an immediate demand:

1. 'Individual items selected according to demand and relevance.'
2. 'No specific policy: general policy is flexible enough to allow this material to be acquired if relevant to teaching and research in the university.'
3. 'Collected on an *ad hoc* basis: no continuing policy.'
4. 'Occasional acquisitions related to expressed research interests: would accept gifts if relevant.'

Curiously, perhaps, there is no widespread evidence in university libraries of an increasing demand from academics for primary materials. This is not to say that researchers feel that adequate provision is being made to meet their requirements: there is a body of evidence to lead one to suppose that the reverse may be true. What it implies is that, for one reason or another, only in isolated cases are university librarians being pressed to acquire more of these materials. Various reasons were put forward by university librarians to explain the obvious reluctance on the part of academics to ask them to provide more. Most inclined to the view that lecturers felt that a general university library was not geared to deal with large quantities of ephemera, and that because of the difficulties associated with identifying, obtaining and processing material of this sort librarians would not approach the task with the necessary zeal.

Some academics undoubtedly prefer to make their own collections of research material since they can then be sure that everything will be directly related to their work, that it will be assembled in one place and will always be immediately available to them. But even when non-personal collections are built up the normal library service is often by-passed. At Reading, for example, a separate Social Sciences Library has been set up to serve the Departments of Economics, Sociology and Politics, and although this is now financed by a small grant from the funds of the university library, it originated in collections of pamphlets and similar material which academics had acquired for themselves. There is justification for the view expressed by one librarian that in some quarters doubt still persists about the respectability of ephemeral material as a vehicle for social research. In some institutions librarians themselves have positively discouraged their academic colleagues. The university librarian of one of the older English universities, for example, declined a collection of ephemera relating to the 1968 revolt in Paris which had been assembled by an academic from his own university.

In order to gauge the attitude of librarians to the acquisition of ephemera a hypothetical case was put to three of them to the effect that they were asked by researchers to collect French political party literature by writing to the party headquarters. The first librarian said he would refuse to do it, though he might endeavour to obtain individually specified items. Asked if he would direct enquirers to existing collections of this material elsewhere he said he would not. The second librarian said that he would try to obtain the material though the job would be only intermittently carried out, probably during vacations. The third said that he would delegate the job to the assistant in charge of gifts and exchanges and that when received the material would have low priority for processing.

An important factor affecting demand is that there must be at any given time a considerable amount of current material relating to topics which are not the subject of ongoing research, and in the nature of things it is difficult to forecast which trends and movements of today are going to be the stuff of research tomorrow. It would be unreasonable to expect any researcher to request material whose future need cannot be positively predicted, especially when it is likely, in his mind, to be at the expense of more immediately relevant sources.

On the positive side, several libraries remarked on the fact that undergraduates in the social sciences are beginning to make greater use of primary materials; and that since a university library's first priority is to provide for the undergraduates much more attention will have to be given to this type of literature. Where libraries have taken the initiative of obtaining primary materials such as the pamphlets and newsletters of political parties and trade unions and placing them in the library, the response from the teaching staff has proved to be positive. At Manchester, for instance, it was said that 'material which the library has collected has stimulated use, rather than the other way round'.

It is in the research institutes that collections of printed ephemera are most highly developed. The materials are clearly essential to the research being carried out and have been assembled by academics and librarians working in close cooperation. There is no doubt that the collection of ephemera requires different techniques from those associated with the acquisition of conventional library materials and that in libraries serving researchers a corpus of expertise has been built up. At Reading, for example, the Institute of Agricultural History has amassed considerable quantities of advertising circulars, inventories for the sale of agricultural properties, photographs, trade catalogues, price lists, posters, specialist newspapers and other ephemera relating to agrarian life and agricultural trade and industry. Some 1,800 individual firms have been approached, and materials have in fact been acquired which the Institute is as yet unable to accommodate.

The following selection of policy statements received from research institutes amply demonstrates their more positive and dynamic attitude towards ephemera as compared with university libraries in general:

1. 'Regular receipts from selected local authorities, and active pursuit of other materials relevant to specific pieces of research.'
2. 'An active policy of acquiring political and trade union material relating to the Commonwealth, and an emphasis on local materials from Africa and the West Indies.'
3. 'The information officer collects grass roots material from local authorities, community relations officers, social workers, etc.'
4. 'The active pursuit of all kinds of documents relating to their field of interest.'
5. 'The library has many standing orders and follows up reports of documents which appear in the Press and specialist periodicals.'
6. 'To identify institutions at home and abroad working in the field and then to acquire their publications by gift, purchase and exchange.'

The libraries of Government departments are in a very real sense national libraries: not only are they financed by the central Exchequer, they are also usually the most comprehensive libraries in their given fields—especially as regards British contributions and interests in those fields. Moreover, since they are obliged to handle all forms of official documents, they are well equipped to meet the special problems of dealing with ephemeral material which they receive from elsewhere. Above all, perhaps, they recognize its value. Most libraries of Government departments contain some unique material, as will become apparent when the catalogues being prepared by Mr A. F. Comfort and Miss Loveless are published. The Department of Trade and Industry Library, for example, has a complete set of weekly reports on activities which cover in detail the work of every division of the former Board of Trade from 1918 to 1939. Some material is deposited in departmental libraries under statutory provision and the libraries are repositories for reports of investigations carried out under contract to their departments. The Overseas Development Administration Library, for instance, has a substantial collection of consultancy reports which have been commissioned by the ODA and of reports by technical assistance experts.

Provided ephemeral materials are required for official purposes every attempt will be made to obtain them virtually irrespective of cost. Their unique position as part of the machinery of central government enables departmental libraries to acquire some material which other libraries may find it difficult to obtain: this applies particularly to foreign literature for which Embassies can act as procurement offices. A typical policy statement is:

> 'An active policy of writing for material that is learned about, both on the Library's initiative and as a result of requests. Mainly in the field of overseas economic, social, etc., affairs.'

As the activities of the central Government extend further into the social life of the country the range and quantity of material required increase in proportion. This is exemplified in the Department of the Environment Library whose intake reflects the general development of interest and research in environmental studies in which the Department itself is taking a growing interest.

While the comprehensive recording of the holdings of libraries of societies, trade unions, political parties, media services and other bodies is an important task which remains to be done, the immediate problem is to find means of ensuring that the unquestionably valuable and often unique collections of printed ephemera which they possess can be preserved as a national asset in the face of circumstances and pressures of one kind or another which constantly put their survival at risk. It is difficult to generalize on holdings of these libraries. Usually they have the annual and special reports issues by other bodies in their subject area, and some have useful collections of survey reports. Acquisitions inevitably depend on the requirements of members and the quality of library service they are willing and able to support. The Librarian of one professional association tends to collect documents reporting facts rather than opinions: he regularly scans some one hundred journals and follows up mentions of these, discussion papers and so on relating to the interests of members. When members make enquiries on particular topics an effort is made to identify and acquire material on and around that topic so as to build up a body of relevant documentation. The collection of ephemera does, however, pose special problems even for the more highly organized libraries. At the Library Association, for example, the difficulty was mentioned of evaluating material from the point of view of deciding what was going to be of lasting importance. Also some material was not acquired due to lack of demand at or near the time of publication.

The Librarian of the Trades Union Congress, who handles large quantities of pamphlets, leaflets and other ephemera, remarked on the increased demand from university and other 'external' researchers and expressed a widespread concern at the danger that outside requests could hamper the service given by specialist libraries to their own institutions. Both the Conservative and Labour Party Libraries reported an increased external demand on their resources and staffs. Academics were also making more demands on the BBC and whilst it was difficult to grant facilities for research, progress had been made in making certain materials—notably transcripts of broadcasts—more accessible.

Last in turn, but not in importance, are the public libraries which can in fact be a very fruitful source of research material, especially in the form of local ephemera. Many public libraries have local history collections and an active policy of acquiring currently produced items of local relevance. In places like Luton, which is remote from any university, the value of having an active local collection in the public library becomes that much greater. To illustrate the wealth of the public libraries, Manchester has some 80,000 photographs (including air photographs), an extensive collection of newspaper cuttings from the local Press, 15,000 trade catalogues, broadsheets dating back to 1642, over 20,000 theatre playbills and programmes from 1750 to the present, telephone directories back to 1921, electoral registers, local directories, and a wide range of examination papers such as those of the Northern Universities Joint Matriculation Board (with various titles) back to 1907 and of the Union of Lancashire and Cheshire Institutes from 1951 to 1957. There can be little doubt that some public libraries are consciously collecting far more printed ephemera than the universities. A high proportion of the contents of their local history collections falls into this category and staff are actively engaged on a continuing basis in identifying and acquiring the material.

Librarians in all kinds of libraries reported instances known to them of collections of material which had been discarded. After the Second World War the League of Nations Library in London was pulped because no other library could take it. Books of Conservative Party Central Office cuttings for the period 1877 to 1920 were discarded and eventually came into the possession of the University of North Carolina who have since made 69 reels of microfilm from the original 735 volumes. Firemen who had been called out to a bonfire in Nottingham were said to have salvaged some important Chartist material from the flames, though some was also lost. Newspaper libraries featured several times: press cuttings were often reported as casualties, notably those of the former *Daily Sketch.* A borstal institution had discarded a large number of case histories through lack of storage space. For the same reason the Northumberland Education Department had discarded nineteenth-century blue books on education and a Private Bill agent had 'dumped cartloads of documents'. Others reported last-minute rescue operations. Local collieries' papers, for example, were collected by Birmingham University when the Librarian was advised that their destruction was imminent.

Whilst there is undoubtedly an additional loss of ephemeral literature through the policy of some libraries to weed out little used material, an attempt may be made in certain cases to deposit unwanted items in libraries where they are likely to receive further use. Some specialist libraries, for instance, transfer duplicated and other surplus documents to university libraries with known research interests. Transfers of this kind are usually made through personal contacts in the respective libraries. Effective transfer of material is, however, hampered by the lack of guides to special collections. The *Aslib Directory* and one or two local directories are useful as far as they go, but both the BNBC and the Aslib Information Department itself remarked on their limitations. Much more needs to be done in respect of listing and describing special collections in all kinds of libraries.

There were complaints that the BNBC can take up to a year to find a recipient library. There was, therefore, a strong temptation to discard material rather than offer it to the Centre. Ephemera posed special problems because of the time-consuming task of listing individual pieces. This applied particularly when the material to be disposed of consisted of a large quantity of miscellaneous items rather than a homogeneous collection which could be adequately described under a general heading. Libraries to whom material was offered direct by the discarding library often took a considerable time to reply. This led to impatience and the temptation to pulp the material instead. The Librarian of one research institute who regularly had useful printed ephemera to offer to other libraries spoke of 'this awful problem of disposing of material'. Material which is offered for disposal through the BNBC and for which a recipient library is not found is not collected by the parent National Central Library. Its ultimate fate rests with the library wishing to discard it.

As I think even this very rapid review shows, the situation all round is really rather deplorable. But it is easier to criticize than to be constructive. So I want to devote the rest of this paper to a consideration of possible remedies.

The general feeling among librarians was that a strong central collection of printed ephemera was required but that it should not compete with or try to usurp the functions of specialist collections. There were, however, a minority who did not favour the development of a large national collection. What was universally accepted was the need for greater co-ordination of acquisitions and the establishment of an information centre which would maintain a directory of special collections and operate a referral service.

Among the advantages of a central collection of ephemera were:

1. it would overcome the present tendency towards fragmentation of related materials;
2. it would be serviced by staff with the necessary specialist bibliographical expertise;
3. it would attract deposits of literature which might otherwise be discarded;
4. access would be guaranteed to the whole community of scholars;
5. it would be the most efficient and economical way of providing foreign material, especially if it were able to have procurement officers in the field;
6. it would provide what is at present lacking in the way of a national documents centre for the social sciences which could negotiate with similar centres abroad, some of which are highly organized;
7. it would provide the necessary impetus for the systematic pursuit of ephemera;
8. it would be able to give advice and guidance on documentation;
9. it would enable individual university libraries to discontinue the acquisition and costly processing of abstruse pamphlet and other material for which there was no immediate or guaranteed future demand;
10. it would be able to accept the deposit of materials collected by scholars for research projects which were now completed;
11. it would obviate the danger of important material not being collected because appropriate specialist centres did not exist.

Those librarians with experience of dealing with primary materials in the social sciences who were interviewed felt strongly that there was a need for a central depository to which materials which, for one reason or another, libraries wished or needed to dispose of could be transferred in bulk. Plans for Government department libraries over the next five to ten years, for example, will make them big collectors of current ephemera. Historical depth will occur only with materials relating to their own departments: all other non-current material will have to be disposed of. Furthermore, if it is to be transferred to some other library instead of being pulped it will have to be handled in bulk, otherwise the job would become too burdensome. In the academic field there is the example of African materials collected by the Scolma libraries, many of which would happily transfer their collections of African ephemera to an active central documents library.

The majority view within the BML is that the national collection of ephemera should form part of the British Library. This accords with the official Museum view that the needs of all classes of users of the national reference service can be most efficiently and economically met by a single comprehensive library. In order to meet the requirements of specialists this comprehensive library would contain a series of specialized reference services, with their own reading rooms.[3] Organization by specialist sections within a large and comprehensive library would save large sums in capital and running costs in comparison with organization in separate specialist libraries.[4] The practice of making special collections of material in a given form (as distinct from an arrangement by subject) is already well established in the British Museum Library. Examples of long standing are the Map Room, Music Room, State Paper Room and Newspaper Library. Doesn't this offer a solution for ephemera?

What is frequently overlooked in the debate over whether or not there should be a central collection of primary materials is that such a collection already exists. At present it is scattered throughout the British Museum Library. If it were to be assembled and organized in a manner more appropriate to its use, not only would the value of its comprehensiveness be recognized but it would also inevitably become the natural national centre for social sciences documentation.

In the present context, the BML needs a new image. On numerous occasions librarians have openly admitted that when they have wished or been obliged to dispose of ephemeral material it has simply never occurred to them to offer it to the BML. This was the case, for example, over the disposal of one of the major newspaper libraries. The inescapable fact is that as regards ephemera the BML in its present form is not seen as the obvious national depository. It is perhaps symptomatic of the general feeling of inadequacy on the part of the national library service in respect of ephemera that an officer in the research department of one of the major political parties advises people who offer him such material to try and sell it to a book dealer. 'In this way', he says, 'it will eventually find a good home—perhaps in an American university.'

It has been argued that any national collection of ephemera should have subject expertise available and that for this reason it should be linked with one or more institutions where research is carried on. Specialist advice and assistance is always valuable and should, of course, be sought wherever possible, but it is unrealistic to expect it to be constantly on tap, and experience shows that it is often not available at the times when it is most needed. The subject expert cannot be expected to be as fully committed to the interests of a library or its users as the professional librarian. Moreover, a specialist in one field is often sceptical of the value of research being carried on in others and this is bound to influence the advice he is called upon to give. Within a given research institution the advice that experts are able to give to the librarian will rightly have a guiding influence on his acquisitions policy, and the result is that the library is tailored to the needs of its users. A national collection can never—should never—be so closely identified with the narrow, personal and often temporary interests of individual researchers. Any national policy for the selection, acquisition and preservation of printed ephemera in the social sciences must transcend the dictates of local and contemporary research.

The extensive collections of British and foreign ephemera in the BLPES place that library in the forefront of discussions on the future pattern of national provision of primary materials, and librarians were therefore asked specifically for their views on its role. It was generally recognized that, although the founders of the BLPES had intended it to have a national function, as now performed this was in reality no more than an altruistic act on the part of the London School of Economics by whom the library was entirely financed. The library was inextricably bound to the School, to whom it owed its primary allegiance, and could not therefore be regarded as having true national status. There was nothing in its administrative and financial structure to distinguish it from other university libraries. There was widespread concern at the difficulties experienced by researchers in using the BLPES. Many shared one librarian's impression of 'a library almost overwhelmed by the demands on it of its primary clientele at the School'.[5] Despite the willingness of its staff to meet outside requests, there are severe limitations on their ability to do so. If, therefore, the library is to play the national role which was the intention of its founders and which remains the hope of today's researchers, considerable improvements will have to be made in respect of access to its collections. The most effective way in which the resources of the BLPES could be developed and made available as part of a national strategy for improving the provision of printed ephemera in the social sciences, would be for that library to receive financial support from the British Library. A particularly important contribution which the BLPES could make to the national library service in the present context is its highly developed machinery for the acquisition of ephemeral research material.

There are those who argue that a comprehensive network of specialist collections would eliminate the need for a strong central collection, but there is much to be said for the view of the British Museum that the proposal to transform academic libraries into parts of the national reference library neglects the different types of people who use libraries. The functions of a university library and those of a national reference library are complementary but different; and to impose upon a university institution the policy which would have to govern the national library would lead to confusion and recrimination.[6] This view is shared by the Standing Conference on National and University Libraries (Sconul), who have said that the resources of university libraries will be needed to supplement the resources of the national library, especially in the case of earlier materials; and to fulfil this function their holdings should be made more widely available. Given this degree of participation, the university libraries should be able to concentrate on the acquisition of materials immediately or potentially relevant to the work of their parent institutions.[7]

Two factors are particularly important in considering the role played by academic and special libraries: their ability to build collections in depth on topics related to their own research programmes, and the extent to which they allow access to their research collections to 'outsiders'. It can be demonstrated that specialist libraries, by pursuing materials within prescribed limits very intensively, can outpace the larger libraries. The Institute of Development Studies at Sussex, for instance, claims already to have put together better collections within defined date and geographical limitations than the School of Oriental and African Studies. There is no doubt that ongoing research provides an enormous stimulus to the collection of materials. At the same time it has to be emphasized that this sort of intensive acquisitions programme is narrowly linked to the research it supports.

On the second point, that of access, a number of librarians are attracted by the idea that specialization can produce collections of manageable size which, if adequately housed, can make the reader feel at home and give him greater facilities of access than in a many-million volume collection. In addition the institutions concerned are likely to have already acquired systems and practices suited to the particular literature which they collect, and they will also have staffs with relevant expertise.[8] Unfortunately, the housing which may be adequate for the needs of researchers belonging to the institution maintaining the specialist library is more than likely to be inadequate for a wider readership, and if the staff were subjected to demands from outside they could well have difficulty in maintaining their high level of service. The willingness of specialist librarians to assist outsiders is not in question, but space limitations and pressures from staffs and members of their own institutions place obvious restrictions on the service they are able to offer to others. The librarian of a non-academic specialist library even said that the demands made by researchers were increasing to the extent that they were tending to usurp the proper function of the various specialist libraries to service their own institutions. In some cases this was causing resistance to requests coming from the academic community.

If specialist libraries are to be recognized as constituting an integral part of the national library service, consideration should be given to how they might qualify for financial or other support. The general view is that Government financial support should be given sparingly and subject to stringent requirements. It should not be sufficient enough to detract from the central collection, to which specialist collections should be secondary. The support should be on an *ad hoc* basis, with specialist libraries able to apply for grants to enable them to acquire specific materials to strengthen existing collections which are part of the national resources and to produce bibliographical guides. In all cases there must be a tangible return to the nation, either by way of guaranteed access to materials not already available in the central collection or in the form of guides to collections.

Clearly, support may be other than financial. A policy may be developed, for example, whereby the national library directs material of local or specialist interest to appropriate libraries. If this were the case there would need to be guarantees of access and adequate records.

The national library service will have to rely to a great extent on public libraries for the collection and preservation of local ephemera, such as election addresses. Although most of this material is acquired by gift, public libraries, too, should be eligible for grants to enable them to obtain collections by purchase when they are deemed to be of national importance. The creation of larger administrative units under local government reform offers the prospect of improved local collections; and if local authorities were able to receive financial assistance for obtaining collections of local material of national importance they might be stimulated to pursue material which would add significantly to the national resources. Into the category of local material of national importance would come, for example, documents issued by and relating to a national trade union whose headquarters are in the provinces. Those national bodies with headquarters in London are rather different, and it is not suggested that material relating to them should be collected by the libraries of the London Boroughs.

There is a good deal of vague talk about 'co-ordination' but no clear understanding of what the term implies. To some it means co-operative acquisition, to others it has overtones of direction from the centre, and to the rest it implies some kind of referral service based on a register of collections. All are, however, agreed that there is an urgent need for a more positive attitude to be adopted by the national libraries, for a statement of national policy against which individual libraries would be able to set their own as yet unformulated objectives. There is a widespread lack of knowledge about what other libraries are doing and what materials they already possess. Above all there is no national focus, no central office able to offer advice and authoritative guidance. The British Museum spoke of co-ordinating the acquisitions of the national reference library with those of a number of other more specialized libraries to ensure comprehensive coverage without unnecessary duplication.[9] The fact must be recognized, they said, that much rare or specialized material not now obtainable is already scattered among a variety of libraries; and that one of the tasks of the national organization must be to assist other libraries to build up their own special collections and to make known where unique material is located. At the same time it must itself acquire material which other libraries are not collecting.[10]

No form of co-ordination can effectively take place without all parties knowing in the most precise terms possible what each of the rest possesses and what it intends to acquire in the future. The first requirement therefore is for the establishment of a central register of collections. Against this each individual library will be better able to assess its own role and adjust its acquisitions policy. In addition to facilitating the co-ordination of acquisitions a central register of collections of research material would also be the basis of a national referral service for the social sciences. Many librarians wished to see the register published while others thought that changes would be so frequent as to render a printed list rather unreliable. The suggestion was also made for a newsletter or periodical devoted to recording and describing special collections. If this were to have a cumulative index it would go a long way towards meeting the wish for a published national register. Since it could also circulate among academics it might stimulate them to make their requirements known and probably encourage them to donate their personal collections to appropriate institutions. A further function of the central register would be to facilitate the deposit and transfer of collections. In this way fragmentation could be reduced and the most appropriate library identified when material became available for deposit from whatever source. The office responsible for maintaining the central register and operating the referral service would be the natural agency for establishing and developing relations with foreign and international organizations such as the International Committee for Social Sciences Documentation. At present there is no such link and Britain is lagging behind other European countries in its international documentation activities in the field of the social sciences. The staff of the central register would not only be able to direct both materials and enquirers to the most appropriate institutions; they would also be required to keep informed on the progress of relevant projects and the state of development and eventual fate of collections which have been built up in support of subventioned research.

In the operation of a national referral service it might be helpful to have a number of subsidiary centres, each concerned with a particular subject area, to which enquiries could be directed. The centres would be nodal points linking the institutions and individuals working in that area. Thus, the Institute of Race Relations might undertake to make itself aware of the resources and expertise available in, say, the Race Relations Board, the Community Relations Commission, the SSRC Research Unit on Ethnic Relations at Bristol, the Centre for Multiracial Studies at Sussex, and the Runnymede Trust. It would also keep a register of research in progress (as it already does) and thus be aware of the specialisms of those who are active in the field. Information transfer between the central office and the nodal points would be a two-way process. To many researchers the latter would be the natural point of entry into the information network.

Finally, I should like to stress the need for more research. This investigation was concerned with problems of librarianship, data handling and information transfer only in so far as they might bear upon acquisition and conservation policies. Nonetheless, several librarians in the course of interview spontaneously widened the discussion and stressed the urgent need for a comprehensive and continuing programme of research into the many and inter-dependent aspects of what may broadly be termed social sciences documentation.

Librarians are faced with a lack of published advice on which they can base coherent policies for the selection of ephemeral material for preservation. There has been very little investigation of the bibliographical and information needs of researchers in the many constituent subjects of the social sciences. What currently available material, for example, is likely to be required by researchers in social administration? Or in Celtic nationalism? Or in the influence of ratepayers' associations on the siting of airports? As the Librarian of the National Library of Scotland said in interview:

> 'There has been no systematic approach to the preservation of ephemera. Collections have relied largely on the chance enthusiasm of the amateur.'

Any systematic approach to the provision and preservation of ephemera on a national scale must begin with a survey in depth of the needs of users, and continue by modifying policies in response to changing needs revealed by constant surveillance.

An equally fundamental necessity is a large-scale study of the most efficient means of organizing and administering collections of different kinds of material in different kinds of libraries. Should the periodical publications of political parties in a national library, for example, form part of a heterogeneous periodicals collection or be located with the same parties' manifestoes, policy documents, leaflets and other propaganda? Is an international collection of statistical compilations in a university library better grouped first by topic—trade, vital statistics, crime, etc.—or first by the geographical areas to which they refer? Is it important for the library of an industrial relations research institute to produce an author index to trade union pamphlets? There is good reason to believe that the deplorable level of library provision of ephemera and semi-ephemera which exists today is in large measure due to the fact that librarians have no body of expertise to which they can turn for answers to basic questions such as these. Problems of handling have constituted a real deterrent to the acquisition of research materials both nationally and locally, and until effective and acceptable solutions are found no significant breakthrough will be achieved.

Most of the major information retrieval, SDI (selective dissemination of information) and CA (current awareness) systems—especially those employing computers—relate to the fields of science and technology. Schemes for the social sciences (such as the pilot public affairs information service devised in the House of Commons Library), on the other hand, often fail to realize their full potential. One of the reasons for this is that since the value of research in the social sciences is less easy to quantify than in science and technology, obtaining the funds necessary to develop schemes to full operational level is that much more difficult. It must also be admitted that many social scientists remain to be convinced that libraries and information centres are capable of making a useful contribution to their research. It is therefore of the utmost importance that the expansion of library collections based on the needs of researchers and practitioners in the social sciences should be matched by advances in techniques of information transfer so as to ensure that those collections are fully exploited.

The graduate schools of librarianship are able to undertake a certain amount of sponsored research. However, the type of sustained programme which is needed in order to analyse, assess and meet the growing demand from social scientists for source material and data, and evolve increasingly sophisticated means of storing and exploiting them, really requires the creation of a separate research centre exclusively devoted to social sciences documentation.

To sum up, my recommendations are as follows:

1. The printed ephemera in the social sciences which at present are scattered in the British Museum Library should be assembled to form a National Documents Library of equivalent status to the State Paper Room.
2. The Department of Education and Science should commission an investigation into the most useful and efficient way of organizing the contents of the NDL.
3. The Copyright Receipt Office within the British Museum Library should be strengthened so as to enable British ephemeral material to which the Library is entitled under the Copyright Act to be more vigorously pursued.
4. In staffing the NDL due attention should be given to the fact that whilst the actual cost of the material which the Library acquires will be relatively low a good deal of staff time will be absorbed in soliciting material.

5. As regards foreign ephemera the NDL should confer with representatives of the Scolma and Parry libraries, BLPES, the School of Oriental and African Studies, the Circle of State Librarians, the British Council and other specialists in order to formulate a satisfactory acquisitions programme. It should also open negotitations with foreign centres of social sciences documentation and with representatives of the American PL 480 and NPAC schemes. The possibility of participating in such schemes as the (American) Co-operative Africana Microfilming Project should also be explored.*
6. The NDL should be made responsible for compiling a national register of collections of research material in the social sciences, for publishing a newsletter and operating a referral service based on this register, and for advising the National Central Library on the most appropriate libraries to which material offered for deposit might be directed. Compilation of such a register is, indeed, a matter of urgency and could be initiated in anticipation of the recommended institutional structure.
7. Provision should be made for the British Library on the recommendation of the NDL to give financial support to specialist libraries, on terms which assure the accessibility of their collections, so as to ensure that material not held or currently collected by the NDL will be made available elsewhere and to improve bibliographical access to it.
8. Adequate photocopying facilities should be provided in the NDL in order to obviate the need for a duplicate loan collection.
9. The NDL should publicize the fact that it is willing to accept collections of ephemera from individuals and other libraries. In appropriate cases it might be made a requirement that material acquired in support of research financed out of public funds should be transferred to the NDL on completion of the projects in question.
10. The Social Science Research Council should give urgent consideration to the means by which it might most effectively promote the creation of a research centre for social sciences documentation.

REFERENCES

1 MALLABER, K. A. Dainton evidence,† C52, 9(a).
2 FULFORD, R. J. *Aslib Proceedings*, 23, 4, April 1971, p. 199–200.
3 TRUSTEES OF THE BRITISH MUSEUM. Dainton evidence,† A23, 102.
4 *Ibid.*, A8, 13.
5 MALLABER, K. A. Dainton evidence,† C52–53, 9(b).
6 TRUSTEES OF THE BRITISH MUSEUM. Dainton evidence,† A20, 86.
7 STANDING CONFERENCE OF NATIONAL AND UNIVERSITY LIBRARIES. Dainton evidence,* B305, 7.
8 GUTTSMAN, W. L. Dainton evidence,† C46, 5.11.
9 TRUSTEES OF THE BRITISH MUSEUM. Dainton evidence,† A21, 89.
10 *Ibid.*, A9, 22.

---

* Foreign material is dealt with in Chapter 8 of the author's full report to the Social Science Research Council.

† DEPARTMENT OF EDUCATION AND SCIENCE. *Principal documentary evidence submitted to the National Libraries Committee.* 2 vols. London: HMSO, 1969.

Ergonomics and information systems

J. G. Fox

Director, Ergonomics Information Analysis Centre,
University of Birmingham

Paper presented at an Aslib evening meeting, Wednesday, 20th October 1971

Ergonomics

WITH an ever increasingly sophisticated technology, man has produced tools and systems which essentially extend his basic capacities: computers to handle calculations beyond his immediate grasp: supersonic planes to transport him faster.

As the systems have become more complex, it has been increasingly apparent that in designing them man has exchanged one problem for others which militate against:

(a) the efficient operation of the systems;
(b) the quick efficient training on the equipment;
(c) the well-being of the human beings in the system.

As a corrective to the normal systems design approach where, with the balance weighted on hardware aspects, the generation of such problems is inevitable, there has been in recent years an injection of human factors' philosophy and data into many aspects of design: treating the human as an integral part of the system and not as a lowly (or exalted) appendage of the hardware. The tendency to react against the concept of man as just another systems' element is not merely excessive pretentiousness. All systems exist to serve human needs and must ultimately be directed by human decisions: equally all systems conform to the general pattern of the design of the higher animals.

Such, briefly, is the philosophy of ergonomics. In practice it has meant a new approach to the classification of the decisions necessary for a comprehensive systems design. Typical of such a classification is that shown in Fig. 1. The emphasis on human factors' problems becomes immediately apparent: all design decisions stem directly from a consideration of the human participation in the system. The crucial point is 'Allocation of functions' which means the division of labour between man and machine. The bulk of the activity which flows from this decision is human orientated—skills analysis, selection and training, job aids, etc.

That this type of thinking is effective can only be demonstrated by experience. But over the past few years it has been found to be a genuine aid to the solution of real design problems.

Information systems

Now information systems are one class of structured man-machine systems and it is possible that the philosophical framework of ergonomics may have something to contribute to their efficient design. Coming from a relative outsider with respect to the Information Science world such a claim may seem to lack humility.

However, recent reports by Martyn[1] and Robertson and Reynolds[2] have reviewed the setting up of specialized information centres with OSTI support. A point which clearly emerges from these publications is that no generalized systems model was used to guide the centres towards the most efficient organization of their resources to fulfil their function. Indeed, only in the case of one is any explicit attempt at systems analysis apparent. In the others, the organization and output of the centre seems to have been based on such criteria as tradition, private (non generalizable) experience, available facilities, pressures and intuition.

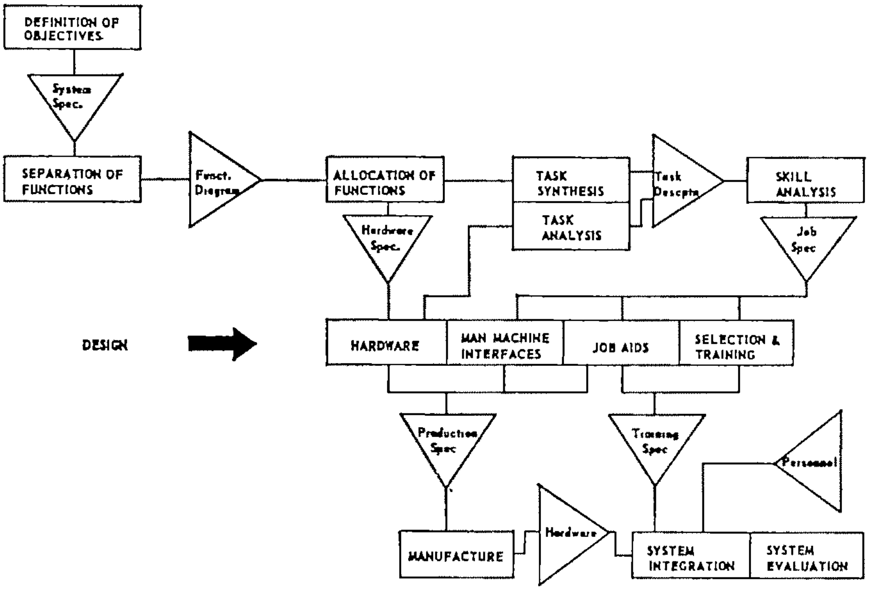


FIG. 1.: *Decisions in the systems design approach*
(Reproduced by permission from: SINGLETON, W. T. The systems prototype and his design problems. In: *The human operator in complex systems*, edited by W. T. Singleton, R. S. Easterby and D. Whitfield. London: Taylor & Francis, 1967.)

One is further emboldened to tread less cautiously by Line[3] who it would seem comes to the conclusion that we have little or no information 'on the design of information systems for human beings'.

Certainly the Ergonomics Information Analysis Centre (which was not included in the above surveys) has after only two years' operation begun to have evidence of the consequences on efficiency of setting up an organization without the benefit of a real systems analysis and design. Time and economic pressure prevented it. For example, among the services provided by the Centre is a priced quarterly abstracts journal. The commercial success of this journal seems assured and on a first examination it would appear to be making a valuable contribution to the flow of information among workers in the field of ergonomics. Closer inspection of the subscriber list, however, must give pause for thought as to the real efficiency of this service.

Taking the United Kingdom subscribers to the priced journal *Ergonomics Abstracts*, we can see that:

(i) 9 per cent are public libraries.
(ii) 46 per cent are libraries of universities, technical colleges, industrial or government concerns with ***no known*** connections with ergonomic activity.
(iii) 45 per cent are libraries of universities, technical colleges, industrial or government concerns with ***known*** connections with ergonomic activity. This group, however, covers only 9 per cent of the academic, government and industrial institutions represented in the membership of the Ergonomics Research Society. It can be taken that there was adequate promotion of the journal in the area.

Ergonomics and information systems

It would be more than imprudent to suggest that ergonomics is the panacea for all information systems design problems. Too often there is insufficient ergonomic data. But it could be that the ergonomic approach applied to information systems design thinking and research might lead to more valid data and more efficient systems.

This would seem to be particularly true when we consider:

(a) definition of the systems objectives;
(b) allocation of functions;
(c) the man-machine interface including the physical environment.

(a) Systems objectives

In the present context, the system's objectives means the implementation of an organizational structure with outputs which are compatible with the stated population's information gathering ***behaviour***. A knowledge of user behaviour then is the crux of a satisfactory formulation of an information system's objectives. However, although there are a number of papers discussing the information ***needs*** of various populations (e.g. Anon.[4]; Paisley[5]; Hiltz[6]; Rosenberg[7]; Gerstberger and Allen[8]; Coover[9]; Wolek[10]; Kegen[11]) they provide little insight into the actual ***behaviour*** of a population seeking information. They provide subjective appraisals of what the user imagines his needs to be in the abstract rather than an objective evaluation of his behaviour in a real situation. 'As a result it is hard to glimpse a real scientist or technologist at work, under constraints and pressures, creating products, drawing upon the elaborate communication network that connects him with the sources of necessary knowledge.'[12] Further, the discussions are solely in terms of information channels which intrinsically have yet to be shown to be effective.

The methods used in these studies have been diaries, passive observation, questionnaires, bibliographic analysis or a combination of these methods. All either intrude on the behaviour of the enquirer causing it to change, or confuse what he says he needs with what he actually uses. The information seeking and using behaviour of the enquirer must be studied objectively and directly within the context of daily research activities in order to obtain valid design information.

It does not appear that data gathering has been attempted by a technique which will allow the test material to be set in the context of a real problem and on a real time scale. Such a technique, however, has been used with some success by Sinaiko and Beldin[13] in ergonomic investigations in what they call 'indelicate experiments'. Briefly the technique is akin to a 'business game' which provides opportunities for observers to note the decisions, strategies, stresses, constraints, etc. involved in achieving the business aim. In the context of an information science study it would differ from a business game in that events could occur in relation to a real problem on a real time scale and the observer, though involved in the situation, could conceal his observer function.

The technique obviates the three criticisms of more traditional approaches: no control of motivation; interference in normal behaviour; lack of regard for the fact that the activity under review is sporadic.

It is only one in the current repertoire of ergonomics techniques which might be appropriate to data gathering in research or information systems. Others would allow features of currently available outputs from information systems to be assessed against criteria related to the normal psychological characteristics of the user populations, e.g. their perceptual processes, problem solving strategies and the like.

(*b*) *Allocation of functions between men and machines*

An important feature in any system which operates by means of an interaction between humans and mechanical or electronic equipment is the allocation of the necessary functions between the humans and the equipment to achieve the aims of the system. The basic point being that many functions can be achieved more satisfactorily by humans than machines, and vice versa. The ergonomics literature carries an item known as 'Fitts List' which makes comparisons. There are many discussions of the philosophy available, e.g. by Jordan.[14]

A machine is only an extension of *some* of man's functions and in some cases he can design a machine which will achieve these functions more successfully than himself and in others a good deal less so. Man can do calculations and he has a reasonably accurate memory storage. But he can build a computer which will do more complex calculations more quickly and retrieve stored data more accurately. On the other hand, a computer can never have the flexibility or initiative of its human counterpart: re-programming a computer is difficult and costly: re-programming a human can be achieved simply by an instruction.

The term 'allocation of function' looms large in an ergonomist's view of a system. His aim is to ensure that functions required to achieve a system's objectives are properly allocated to either man or machine: not simply on the basis of cost, but on which will achieve that aim most effectively, based on their known capabilities to achieve the objects of the system. Thus, he has no pre-conceived notions that mechanization, being the 'in-thing', is always appropriate to our needs.

However, the development of information systems would appear to have proceeded on the uncontested superiority of mechanized components. Storage and retrieval problems would currently appear to revolve around the upgrading of handling of alphanumeric material from manual to mechanized systems. This generally seems to have precluded an evaluation of manual vs. mechanized systems, with respect to what each has to offer in terms of the real needs of the dissemination functions of the system: or more important, an evaluation of manual/mechanized systems to determine which functions should be carried out by man and which by machine.

Perhaps a technique which was used by Kinkade and Van Cott[15] might have been applied with advantage to many information systems. With the insistence of the ergonomics philosophy that mechanization only extends normal human functions, they implemented an experimental system where all the critical subfunctions—which eventually could be either manual or mechanical—were first assigned to human operators. Using human operators in such an experimental system gives a flexibility which would be impossible to achieve using a mechanized system. It can adapt to its users rather than have its users adapt to it. By assembling human elements into a simulated information system of this type, it is possible to create a large number of alternative models by varying the number of human elements, their communication links, training and instructions. The behaviour of each configuration can then be measured experimentally comparing it with other models or with performance criteria established by users. But most important, by placing few or no constraints on its users, those features which the system acquires as it adapts to its users can be identified and observed: and the viability of their mechanization be determined against real criteria for the systems effectiveness.

(*c*) *The interface*

When we consider the interface of man and machine in an information system, the ergonomist has no lack of data. Let us take a single example.

Of the many aspects of the job interface the display offered by the use of microfiche reveals some interesting insights on how an ergonomist might evaluate it in relation, say, to visual fatigue.

First, *polarity*: the image displayed can be black letters on a clear background (positive) or, as is more common, clear letters on a black background (negative).

Now positive film gives the greatest speed and comprehension rates. It does, however, produce glare from the rear projection lamp used in most readers. This causes visual fatigue and initial speed and comprehension will decrease.

Negative film, on the other hand, while giving a low level of illumination over the reading area, will cause the surrounds to be at a higher level of illumination: thus objects moving in the area adjacent to the screen will not only be distracting but cause visual fatigue by being continuously seen out of focus.

Thus, there are points in favour of both positive and negative displays. On balance, the negative is preferred since it provides positive printouts and the problem of fatigue can be alleviated by a light surround to the screen.

A further point about illumination *per se*, no matter if positive or negative film is being used. The reading screen should be highly diffusing. The type of frosted screen where the area in direct line between the eye and the projecting base is brighter than the rest causes fatigue.

Second, ***reduction and blowback ratio***: reduction of microfilm is to the point where it cannot be seen with the naked eye. The ratio of the size of the original to the size of the micro image is the reduction ratio, e.g. a 19:1 reduction means a document 19 inches in length will be reduced to 1 inch in length: an aperture card is 16:1; ultrafiche is 120 or 150:1.

The blowback ratio is the opposite: that is, the amount by which the reduced micro image is enlarged when it is projected.

Now, because of ease of reproduction, users, especially in the USA, are commonly operating with third, fourth or even fifth 'generation' copies. At each generation the copy is degraded so that, by at least the third, there is insufficient resolution for each reading of the alphanumeric material without visual strain.

This limits the degree of reduction which is allowed for different sizes of print on the original.

For example, the maximum reduction ratio should not exceed 12.7:1 to provide adequate resolution in blowback of 6 pt type (telephone directory point) nor should it exceed 20:1 for 10 pt type (books and typewriter point).

Considering blowback in general: on a screen it should always be 110 per cent of the original size to allow easy readability. While for blowback prints the argument changes and the indications are that 60 per cent of the original size may prove to be the desirable ratio. The image helps to conceal the break up of black areas which would decrease readability.

Third, ***visual relaxation***: not withstanding the above points, some periods of relief and relaxation of the visual mechanism are essential to avoid excessive strain. This is best achieved by focusing the eye on distant views from time to time. Thus the idea of a completely enclosed booth which might be useful from an illumination point of view would be undesirable.

These are just a few of the ergonomic problems of the interface in current equipment.

The future holds much more exciting prospects for the use of ergonomics in dealing with the information interface.

In future mechanized systems it seems that television screens will be necessary and practical as routine sources of output. Many information systems users will have a need for geometric displays such as are required for maps, circuits, workplace layout and the like, as well as normal alphanumeric material.

When this happens, ergonomics will have much to offer in the design of the displays. Currently in the files of our Centre we have over four thousand abstracts on human factors in display design.

We should be able to offer new possibilities for improved information display over that offered by the teleprinter. Not only do television displays provide a needed capacity for the display of geometric information into more effective formats than conventional linear sentences and paragraphs, but all types of mapping and textural information become possible. Graphical symbology and logic diagramming techniques have already been developed which allow the compression of complex descriptions into single diagrams. Yet another technique is being developed in which spatial arrangement of textural information is used to portray the logical relationship of the information.

There is obviously little in the ergonomics of the normal physical environment which is specific to information systems. However, we have been interested in the creation of an artificial environment in experiments carried out by the Ergonomics Information Analysis Centre and this might be of interest. Our concern has been with the use of background music to enhance human efficiency.

At first sight, it might look as if background music would be anathema to efficient information service work. But there seems to be a good case for the alternative view.

Many tasks in an information service are routine: they may be intrinsically interesting—even absorbing—but by their nature they offer little variety in the form of stimuli with which the brain has to deal. However, the brain, no matter how motivated the worker, requires variety in its stimuli to remain efficient by keeping the level of 'arousal' high.

In recent years experiments have been carried out to test the idea that if the brain arousal level cannot be maintained by the stimuli of a primary task it might be kept high by variety of stimuli from a secondary source, which does not interfere with the primary task.

Background music has often been used as the secondary source and the results have been significant in mental tasks (e.g. learning Russian phrases) and in routine tasks found in an information centre, (e.g. keypunching).

Of course, it must be used with discrimination. For example, it should not be played continuously or else it becomes part of the fixtures and loses its essential characteristic: a source of variable stimuli.

Conclusion

As one who is essentially still an outsider to Information Science might I close by giving you the, perhaps doubtful, benefit of an outsider's view.

To me, the explosive growth of Information Science has been a bit like Topsy. It seems it just grew with little guidance or evaluation. Perhaps the next decade should be characterized by a slower growth rate and more emphasis on analysis and evaluation. If this should be so, the ergonomist will have a major contribution to offer.

REFERENCES

1 MARTYN, J. *Notes on the operation of specialised information centres.* London: Aslib, 1970. Aslib Occasional Publication No. 5.

2 ROBERTSON, S. E. *and* REYNOLDS, R. Five specialised information centres. *OSTI Report No. 5050*, 1969.

3 LINE, M. B. On the design of information systems for human beings. *Aslib Proceedings*, **22**, 7, July 1970, p. 320–35.

4 ANON. Information requirements of physicists and chemists. *Bulletin* (The Institute of Physics and the Physical Society), **16**, 1965, p. 278–80.

5 PAISLEY, W. J. The flow of (behavioral) science information—a review of research literature. *Stanford University, Institute for Communication Research Report*, 1965.
6 HILTZ, S. R. Opinion Survey on Volume I of the U.S. Army Human Factors Engineering Bibliographic Series. *Human Engineering Laboratories Report*, Aberdeen Proving Ground, Maryland, 1967.
7 ROSENBERG, V. Factors affecting the preferences of industrial personnel for information gathering methods. *Information Storage and Retrieval*, 3, 1967, p. 119–27.
8 GERSTBERGER, P. S. *and* ALLEN, T. J. Criteria used by R & D engineers in the selection of an information source. *Journal of Applied Psychology*, 52, 1968, p. 272–9.
9 COOVER, C. W. Users needs and their effect on information centre administration. *Special Libraries*, 60, 1969, p. 446–56.
10 WOLEK, F. W. The engineer: his work and needs for information. *Proceedings of the American Society for Information Science*, 6, 1969, p. 471–6.
11 KEGAN, D. L. Measures of the usefulness of written technical information to chemical researchers. *Journal of the American Society for Information Science*, 21, 1970, p. 179–86.
12 PAISLEY, W. J. Information needs and uses. *In: Annual Review of Information Science and Technology*, 1968, p. 1–30.
13 SINAIKO, H. W. *and* BELDIN, T. G. The indelicate experiment. *In: Information Systems Science.* London: Macmillan, 1967.
14 JORDAN, N. Allocation of functions between men and machines in automated systems. *Journal of Applied Psychology*, 47, 1963, p. 161–5.
15 KINKADE, R. G. *and* VAN COTT, H. Human simulation applied to the functional design of information systems. *Human Factors*, 10, 1968, p. 211–16.

DISCUSSION

MR M. B. LINE (Librarian, NCL, formerly of Bath University), while appreciating the value of background music in maintaining brain arousal in performing certain tasks, wondered if illustrations in a printed text could serve something of the same purpose, and if so, should one aim at illustrated abstracting journals. He also asked whether information systems were aimed at libraries or users, and what happened when abstracting journals were bought by libraries. Mr Line thought that they often stayed on the shelves, since libraries will buy almost anything with 'abstracts' in the title, and this is a very poor test of the effectiveness of an abstracting journal. Effectiveness, he stated, can be divided into two factors, i.e. first the capability of doing what is required (in the technical sense) and secondly, its usability and acceptability. While much is known about the former, very little is known about the latter. In some modelling work proposed at Bath University Library on abstracting and indexing journals, it is hoped that some data can be found on usability aspects, i.e. relative acceptability of monthly publications with few abstracts per issue or a quarterly publication with three times as many abstracts per issue. However, there is considerable difficulty in trying to carry out an objective study of users, as the results tend to be impressionistic rather than qualitative.

MR FOX replied that the points put forward by Mr Line were similar to his findings. As for what happens to journals on the library shelves, only 9 per cent are covered, so the inflow of information abstracts does not really reach many people. Large-scale research therefore must be made, ranging from traditional users to non-users. It is quicker to experiment, i.e. watching what the user does. It is, however, very difficult to disguise oneself and many people trained as behavioural observers should be used as research supervisors to see what is going on.

MISS VERONICA BRETT (Lancaster University Library Research Unit) said that ergonomics applied to any system is attacking it *per se*; thus there are many openings for ergonomics. Essentially a library is an ordered collection of information which should be readily transmittable to the user. However, it is at the interface between information and the user that the librarian keeps guard, holding the key to the information, and he knows where it is and how it could be used. Librarians are the best equipped people to teach the user how and when to use the library, and the way in which this is done is an important ergonomic problem. One example of information-user interface is the catalogue, the average of which contains more information than the user needs to find a book: so most of the catalogue is 'noise'. This confuses the user and inhibits efficient use of the library. The catalogue, as it exists, has been designed by librarians for librarians, but it is also an important tool for the user in accessing library information, and as such should be modified to suit this use. She thought that there should be a rethink of catalogue design so that the onus on librarians answering trivial questions would be reduced and proper use of libraries increased.

MR R. HORTON (University of New South Wales) said that he was neither an information scientist nor an ergonomist, but a librarian. He believed that applying abstracts in different ways is wrong. What is needed are librarians to educate the user. However, ergonomics is applicable to machines like microfiche readers, but in fields like *Ergonomics Abstracts*, its use is too varied for the techniques of ergonomics to be valid. Ergonomics can, however, be a tool to back up the important personal role that librarians play at the interface with the user.

MR J. DANDA (Institute of Computer Science) commented that most of the present information systems are of the off-line type. Information filed on magnetic tapes, i.e. catalogues and indexes, can be output by means of line printers. There are disadvantages in this approach because information in printed indexes is not always up to date. Also, users' enquiries have to be interpreted by someone with knowledge of the system in order to retrieve the information required. In the near future, new information systems will emerge, which should immediately be organized as 'on-line computer-aided information systems'. It is important to recognize that, for certain information functions, it is better to use human beings rather than machines, and it is the role of ergonomics to allocate functions to both the human and machine parts of such a system. Monotonous routine tasks should be performed by computer rather than by library staff. The computer system should be designed so that it can be used by the enquirer to answer routine questions, and when necessary enable him to request the help of a librarian with access to the same system. Designing such a system will not be easy and ergonomics will play an important part. Mr Danda concluded that the proper use of ergonomic rules is the key to successful design in advanced information systems.

DR P. R. E. LEWKOWITSCH commented on the fact that, not only was the library user unable to use the information tools available (catalogue, etc.), but did not even know how to formulate the question as to the information they were seeking. It could take the information officer half an hour of questioning to ascertain the users' real need.

MR C. W. CLEVERDON (Cranfield Institute of Technology) said that the difficulty in carrying out a design study lies in the fact that a system cannot be designed in a vacuum. Other systems, some formal and some informal, will already exist, and one has to decide what effect the new system will have on the present usage patterns. He also asked whether the system should be 'bent' to the user or the user to the system.

MR FOX replied that in real life situations some 'bending' of the user must take place.

The London Classification of Business Studies and management literature

K. D. C. Vernon
in association with Valerie Lang

London Graduate School of Business Studies

Based on a paper presented at a meeting of the Aslib Economic and Business Information Group, at the London Graduate School of Business Studies, 15th June 1971

IN THIS paper we are concerned with two related topics—management literature and *The London Classification of Business Studies*.[1] To understand the purposes and structure of the *Classification* it is essential first to consider the scope and content of management literature. But management literature would not exist, certainly in its present form, without the business schools, and so it is appropriate to begin by attempting a very brief answer to the question—what is management education? This fine new building in which we are meeting, with its lecture theatres, seminar rooms, computing facilities, its important library, its excellent residential accommodation, helps to provide a visual answer. But it is necessary to consider a broader perspective.

Management education

Business schools, as we know them today, have only a short history. The first school to embark on management education at university level was the Wharton School of Finance which was established in 1881 at the University of Pennsylvania. Seventeen years later, in 1898, the Universities of Chicago and California set up their business schools. Others soon followed in America, and in 1908, the most famous of all, the Harvard Business School, was founded.

All the new schools had difficulty in winning academic status and in carving out a clear-cut role for themselves—they were sometimes considered to be 'too practical' and so they could not be considered as academically respectable. Until the beginning of the First World War therefore the growth and extension of business schools in America were comparatively slow. But between 1920 and 1939 there was an enormous expansion in management education at university level and another similar expansion after the Second World War. Today there are about 140 separately organized business schools accredited by the American Association of Collegiate Schools of Business and, including departments of universities, some 650 institutions in the USA offer degrees in business studies. About ninety thousand first degrees are awarded annually and twenty thousand Masters' degrees.[2]

Compared with these figures management education in this country has been negligible until recent years—it was largely confined to colleges of further education. In 1947 the British Institute of Management was founded and began to create a more favourable climate of opinion towards management education. In the same year the Administrative Staff College at Henley was established and began running its now well-known management courses. But industry was sceptical of postgraduate courses in universities until after 1960, when attitudes began slowly to change. Then in 1963 came the Robbins Report[3] on Higher Education and the Franks Report[4] on British Business Schools, both of which stressed the urgent need to take management education seriously in this country and establish two business schools of major scale and top quality. The schools were to be financed jointly by industry and the government. The climate of opinion was now right, and everybody was in agreement that the necessary money must be provided quickly so that this country could begin in earnest the task of systematically improving the general standard of management.

By the beginning of 1966 the postgraduate business schools at London and Manchester were embarking on their first courses for executives. Since that time, not only these two leading schools, but also the whole movement towards the development of management education, has been gathering momentum rapidly—some would say too rapidly. Even so, there were only 2,300 full-time postgraduate students at our business schools, universities and colleges of further education in 1969–70.[5] In addition, however, there are now some eight hundred organizations busily engaged in providing seven thousand management courses, conferences, meetings and seminars each year. It is a constantly evolving situation. Within a period of five years we have virtually seen the birth, rapid growth and now re-examination of management education in this country. Immense progress has been made in a very short time.

Management literature and business information

Just as in any other profession—law or medicine, for example—the theories, ideas, concepts, research, applications and practice of management and business are embodied in the literature. The difficulty, however, arises immediately we try to define, in terms of the literature, the words 'management' and 'business'. Here then are two very general definitions which do no more than indicate the broad subject coverage. Henderson[6] has discussed 'commercial information' which is virtually the same thing. *Business information* is concerned with:

(a) Activities of enterprises and organizations, especially those concerned with trade, commerce and manufacture.
(b) Techniques and methods available for managing these activities and solving problems which arise.
(c) The environment within which business operates.

Within this broad definition we can now say that *Management literature* is more specifically concerned with:

(a) The manager's job—planning and policy making; organizing resources, including personnel, to achieve objectives; motivating and communicating with people; controlling operations.
(b) All aspects of decision making and problem solving.

(c) The behaviour of people in organizations and work groups.
(d) Those aspects of the environment, especially the economic and social conditions, which affect business decision making.
(e) The theories, concepts, principles and disciplines which underlie all the above activities.

Business schools try to teach these things and carry out research into relevant problems.

That is the general content of the literature which we had to provide for in *The London Classification of Business Studies*—for 'business information' because business operated by using information, and for 'management literature' because managers are rapidly becoming professionals and must learn their profession—they no longer just 'manage', they manage by objectives, by results or by participation, for example; or if they have a problem to solve, they have first to build a model. The only cohesiveness of this literature is the fact that management can be studied and taught, as any other profession, and there is an accepted body of knowledge which is recorded and discussed in the literature. Furthermore it all has to be stored, arranged and used in libraries, and management education is leading directly to an increasing demand for the literature at all levels, from superficial requests to research needs in depth. Today's sophisticated professional manager needs to consult the literature as never before, and the graduates from business schools are particularly aware, by the time they take up their posts in industry, that management literature and business information, as I have tried to define it, is relevant and necessary for helping their decision making. The great and thriving libraries of the large American business schools such as Harvard, the MIT, Chicago and Stanford for example, illustrate how management education has created there a continuing demand for the literature. The rapid development of the two libraries at the London and Manchester Business Schools illustrates the same point.[7]

If management education in this country goes on expanding in the ways Professor Rose has discussed in his Report, it will not be surprising if the demands on the libraries at the London and Manchester Business Schools, which have already grown so rapidly in five years, increase in direct relationship to the growing numbers of students passing through these Schools who now require to make continued use of the literature. The expansion of the libraries in the business schools at Bradford and Warwick Universities, the increasing demand on the already busy BIM Library, the constant pressure on the excellent services and facilities of the recently founded City Business Library and the older Manchester Commercial Library, are all concrete illustrations of the relevance and importance of the literature to managers and business. There has also been a growing realization among librarians of the necessity to use modern management methods in the organization and development of libraries.

In Europe too the developing business schools and management centres are all now providing library and documentation services. The library of the important international business school known as Insead, at Fontainbleau, is giving a vigorous lead to others and provides a splendid example of how modern information techniques can be used in handling management literature.

The need for a classification of the literature of business studies

Now let us go back five years to 1966. It was obvious that the rapid expansion of management education in this country, which was then just beginning, would lead to an increasing demand for the literature and hence for library services. The literature would have to be arranged in libraries and controlled in such a manner that information relevant to management and business could be quickly retrieved. We were poised on the brink of forming important new libraries at London and Manchester; other new libraries would follow and existing collections elsewhere would obviously be expanded. A lead was evidently wanted immediately. What were we to do in this situation? Should we use one of the existing schemes and adapt it? Forget about classification and the arrangement of books on shelves and start a co-ordinate indexing system with perhaps our eyes set on the promised land of mechanical information retrieval? Or should we compile a new classification and then move on to using the terms in it as a thesaurus for further deep indexing?

We began by looking carefully at existing schemes and considered the problems of adapting them to our purposes. *Dewey* or *Library of Congress* would have advantages if we were ever to use Marc tapes. But they had very grave disadvantages for an interdisciplinary, vague, rapidly-changing subject area like ours. We considered *Bliss* but the plans for a new British edition had not even begun to take shape in 1966. We were tempted to use *UDC* but the BIM Library was gravely dissatisfied with it as a classification for management literature.

What about the more specialized newer schemes? The *Harvard Classification of Business Literature* seemed too rigid in its framework, and the Baker Library, where the system was originally compiled in 1937, was not enthusiastic about its virtues. We decided, however, that we might well use terms from this Classification or even adapt parts of the schedules. The *OEEC Documentation Division Classification* seemed to have fallen by the wayside. Nevertheless its schedules were interesting. The outline of the *Insead Plan de Classification* seemed very good, so perhaps we could develop it further—it was compiled for *Management Documentation*, an abstracting service organized by Georges Sandeau, Librarian of Insead.

How about the faceted schemes, such as Kyle's social science classification—surely we could use this? Langridge's *Classification of Enterprise Activities*—yes, perhaps we were getting nearer to the answer to our problem, even though 1956, when Langridge compiled his schedules, was virtually a different age compared with the developments taking place in management education in 1966.

What about co-ordinate indexing instead of a classification? Why bother about the arrangement of books when we had the chance to experiment? No—we had the brief to build a new library quickly and the duty to provide a service for readers without delay. Others were also looking to us for a lead because nobody else had given much thought to the problem of controlling and disseminating the literature in this subject area. Our new Business School was admirably placed to give the lead that was wanted. But it must be a practical lead and there was no time for years of lengthy, theoretical research and discussion.

We therefore decided to compile and test a new classification scheme using the principles of faceting, but basing it firmly on the agreed general methods now being developed in teaching management. Foskett and Langridge encouraged us in our original thinking and then, at the same time, OSTI agreed to finance the project for two years. (Valerie Lang started investigating the terminology and compiling the schedules in April 1967.)

Our original intention was to go on and make the index to the classification a thesaurus of terms. Soon after we started, however, John Blagden, who was then Librarian of the British Institute of Management, also received a grant from OSTI to prepare a thesaurus of management terms.[8] Now, with hindsight, one can see that these two research projects might, with advantage, have been amalgamated. Nevertheless the problem of bringing some bibliographical order to the literature of business studies was now being tackled from two angles and that, in itself, was a good start.

Above all our classification scheme had to be practical and immediately usable in our new Library, which was to be the guinea-pig. It was to be used at the Manchester Business School and then subsequently in other libraries. Compiling a classification is always a lengthy and complicated task; but making it in such a way that it could be used for the arrangement of a rapidly growing library and for retrieving information even before the schedules were completed, meant that ideas and theories were tested, amended, rejected or adopted at great speed. In the circumstances then prevailing perhaps that was the only way to get the job done. That is the brief story of how and why this new classification was born.

The schedules*

Being a practical working tool the *Classification* contains clear instructions on how to use it, and so it is necessary to read the 'Introduction' which discusses not only our method but also gives notes and instructions for each facet and class. In addition the *Report*[9] which we submitted to OSTI gives a detailed account of the whole operation—it describes how we compiled, tested and revised the schedules over a period of three years, and includes appendixes on how we tried to use the Kyle Classification and on a comparison which Valerie Lang made between rotated and permuted filing orders.

The literature of business studies forms no neat homogeneous subject field which can be easily analysed, like the subject fields of most faceted classifications. Its only cohesiveness lies in the fact that management can be taught and studied and has developed an accepted professional literature, as I have discussed above. We quickly recognized that there were three broad main categories which we would need in the classification:

Management responsibility in the enterprise
Environmental studies
Analytical and quantitative techniques.

---

* See Appendix for synopsis of the schedules.

The first of these categories is similar to the subject area covered in Langridge's pioneering faceted classification of Enterprise Activities, and includes the functional aspects of business; the second includes the almost undefinable environment which impinges on business activities and includes much of the area which Kyle included in her *Classification of the Social Sciences*; the third is concerned largely with the use of mathematical and statistical methods in decision making. Together these categories are the main subject areas which are taught and studied in the business schools and are used in the conduct of business activities. The main facets and classes within the three broad categories were formulated from the terms we had started to collect by examining the literature, and by consulting Jean Aitchison, who was then preparing her *Thesaurofacet*. Our academic colleagues at the London Business School also gave us considerable assistance and advice.

The problem of analysing and grouping the terms in the main facets and classes was difficult. We quickly decided that we could not achieve uniformity of division throughout if at the same time we wanted to provide the most helpful arrangement for the modern user, in a developing situation. To attempt a rigorous analysis of the terms into mutually exclusive facets, using characteristics of division such as 'things', 'properties' and 'processes', was bound to lead to an arrangement which would be unacceptable to the users of the literature. Although we were not compiling a classification for our own use, it still had to be borne in mind that our Library and others which would adopt the classification would be open access libraries and their users would require to browse. We therefore decided to choose characteristics of division which seemed appropriate to the terms within each main facet and class. For example, the terms in marketing (see Appendix) have been divided by:

product classes
scale or type of marketing
research
forecasting
promotion
pricing
distribution
selling

The groups of terms obtained by this process have been arranged in the marketing schedule in roughly a chronological sequence from the product classes to the final selling and buying of the products. In the finance facet (E) there are three main groups of terms concerned with financial institutions, financial management within the enterprise, and accounting, which can be described as the language of financial management.

The second broad category (see Appendix)—the environment within which business operates—is immense and the classes are in fact the various environments and constraints which affect business decision making. We have made liberal use of explanatory notes and have produced much fuller schedules for those parts of the environment which have the most influence on business, e.g. economic principles, conditions and methods; industries; behavioural and organizational studies and social conditions. Politics, science and philosophy on the other hand have merely been given skeleton schedules and contain the minimum number of terms. We have made some use of Kyle's Classification, particularly in Class L and have based Class N on Foskett's *London Education Classification*. Class P is based on Moys' *Classification Scheme for Law Books*.

The third category—analytical techniques—contains schedules for the basic disciplines of mathematics and statistics; for operational research; for automation, data processing and computers; for O & M and work study. It is concerned mainly with the use of quantitative methods in problem solving.

Then finally there are auxiliary schedules for People and Occupational Roles, Industrial Products and Services, Common Properties, Common Activities, Geographical Divisions, Time, Form Divisions and Languages.

Terminology

The *Classification* now contains some 3,500 terms, all of which have been taken from the literature of business studies. Many of the terms have imprecise and sometimes different meanings in different contexts, e.g. productivity. Some terms are concerned with new and evolving concepts, while others have originated in America and have been modified subsequently by English usage. Sometimes there are differences between British and American usage of the same term, or different British and American terms have in fact the same, or nearly the same meaning. Frequently terms are used in the literature as part of the professional jargon in such a way that their meanings remain vague—e.g. Organization development. Concepts are often expressed by two or more terms which could be separated into their constituent parts, but we have sometimes considered it advisable to retain such concepts as terms or descriptors in their own right, e.g. Technological change.

All classifications have terminological problems, but in management and business the terms are particularly imprecise and arbitrary and liable even to be fashionable for a short time and then almost to disappear from the literature. We have therefore included many terms in the schedules which, for various reasons, did not seem to require independent positions, by putting the letters UF (Used For) before such terms. UF now precedes synonyms, near synonyms and sometimes subsidiary terms which did not seem to require a place of their own, at least for the time being, but could preferably remain under the more inclusive term.

We have made liberal and frequent use of scope notes to explain terms in their context and to assist users of the classification. Such scope notes are particularly necessary in the large classes 'J–Economics' and 'L–Behavioural sciences', both of which are obviously not complete, detailed classifications for these enormous subject areas.

Notation and preferred order

Upper case letters have been used for the notation because they are clear—in fact clearer than a combination of upper and lower case—easy to handle and provide a wider base than numerals. We have used numerals only for the auxiliary schedules. The intra-facet connector is an oblique stroke, which again is perfectly clear and immediately indicates the fact that two or more elements of the classification have been combined. Hierarchical order has been used for the notation because it clearly shows relationship. In practice we have found that the notation seldom becomes cumbersomely long.

We chose to use a preferred order of citation because it limits the number of choices open to the classifier, simplifies his work and ensures consistency. We considered these to be overriding virtues in a subject area which was constantly developing and changing like a shifting sand-bank. Others may wish not to use our preferred order of citation but follow instead their own choice at the time of cataloguing each document. Our citation order is in straight alphabetical sequence with two exceptions—'A–Management' which always comes second when facets are combined, and 'P–Law' which comes first in combination. We made these exceptions in the light of experience. A further and more extensive discussion of the notation, preferred order of citation and the exceptions will be found in the 'Introduction' and Report.

Index

Finally, the index contains all the terms in the classification arranged in alphabetical sequence. It includes a few terms which are in fact classified by combining two facets together; we have done this because they are frequently used, and the library user might otherwise find it more confusing to have to co-ordinate certain well-known terms at the time of search, rather than to look for them in the index, e.g. Bank rate ECB/JJD. A visible strip index of terms in the classification has proved to be convenient for users of the catalogue and easy to maintain.

Conclusion

This classification provides a practical arrangement of terms and concepts which we consider is logical, flexible and related to the way in which the literature of business studies is used. It is a map of a great, amorphous and interdisciplinary subject area, showing not only the structure of the most important aspects of business studies, but also the outlines of the disciplines and subjects which impinge on it. The scheme is firmly based on the fact that it is practical, up-to-date and purpose-built, and the rules of facet analysis have been bent and twisted to suit the rapidly developing and expanding literature of business studies. Terms and concepts have been arranged for convenience, but 'properties' usually precede 'activities' and 'processes' are usually arranged chronologically.

The scheme has many weaknesses and problem areas and we are particularly conscious of these in, for example, the area of industrial sociology and organizational studies. Some facets require expanding by the inclusion of many more new terms, but we are adding terms to the schedules as we come across them, although at present we are not attempting more than straightforward additions and minor amendments. In practice, however, we have found that the classification can be used satisfactorily as a means of arranging and controlling the literature. About twenty other libraries are now using it, or parts of it, and we are keeping them up to date with amendments which we make from time to time (see note at end of Appendix, p. 198).

This classification, imperfect as all classifications are, has at least provided librarians and others with a tool, or perhaps I should say weapon, which can be used to tame a growing monster in the shape of the literature of business studies which was threatening to run wild.

REFERENCES

1 VERNON, K. D. C. *and* LANG, VALERIE. *The London Classification of Business Studies.* 2nd impression. London Graduate School of Business Studies, 1971.

2 ROSE, HAROLD. *Management education in the 1970's: growth and issues.* London: HMSO, 1970.

3 *Report on the Committee on Higher Education.* (Robbin's Report). London: HMSO, 1963.

4 FRANKS, LORD. *British Business Schools Report.* London: BIM, 1963.

5 NEDO MANAGEMENT EDUCATION, TRAINING AND DEVELOPMENT COMMITTEE. *Second Report.* October 1971.

6 HENDERSON, G. P. Commercial information. *Aslib Proceedings*, **22**, 4, April 1970, p. 135–42.

7 VERNON, K. D. C. Today's managers need libraries. *Proc. R. Instn.*, 43, 200, 1970, p. 22–34.

8 BLAGDEN, JOHN. *Management information retrieval: a new indexing language.* 2nd edition. London: BIM, 1971.

9 VERNON, K. D. C. *and* LANG, VALERIE. *The London Classification of Business Studies: a report submitted to OSTI* (duplicated typescript). London Graduate School of Business Studies, 1969.

APPENDIX: *Synopsis of the schedules*

Facets and classes are combined in alphabetical order, with the exception of A which always comes second.

Management responsibility in the enterprise

A	MANAGEMENT
AA	Management
AB	Management Personnel
AC	Management Education
AD	Corporate Strategy
AE	Managerial Activities
AF	Managerial Functions
AH	Project Management
AZ	THE ENTERPRISE
AZA	Business Enterprise
AZB	International Enterprise
AZC	Private Enterprise
AZD	Mixed Enterprise
AZE	Public Enterprise
AZG	Interfirm Studies
AZH	Small Businesses
AZK	Large Businesses
AZL	Industrial and Commercial Associations
AZM	Environment of the Enterprise
B	MARKETING
BA	Marketing
BB	Classes of Goods Marketed
BC	International Marketing
BD	Marketing Research
BE	Sales Forecasting
BG	Marketing Campaigns
BH	Product Planning
BK	Advertising
BM	Pricing
BN	Channels and Systems of Distribution
BNZ	Physical Distribution
BP	Sales Force Control
BQ	Personal Selling
BR	Sales Promotion
BT	Shopping
C	PRODUCTION
CA	Production
CB	Types of Production
CD	Production Development
CE	Production Planning and Control
CF	Value Analysis
CG	Production Methods
CH	Production Equipment
CM	Factory Management
CP	Production Services
D	RESEARCH AND DEVELOPMENT
DA	Research and Development
DB	Research

DC	Development
DD	Results of Research
DE	Patenting
DF	Research Facilities (physical)
E	FINANCE
EA	Finance
EB	Financial Markets
EC	Financial Institutions
EE	Business Asset Management
EF	Portfolio Investment
EG	Business Formation and Liquidation
EH	Land and Property Finance
EJ	Personal Financial Management
EL	Accounts and Accounting
F	PERSONNEL
FA	Personnel Administration
FB	Selection of Personnel
FC	Personnel Training
FD	Status of Personnel
FE	Conditions of Employment (non-financial)
FF	Remuneration
FG	Financial Benefits
FH	Social Benefits
FJ	Employee Communication
FK	Industrial Relations
FL	Working Conditions
G	OFFICE SERVICES
GA	Office Services
GC	Secretarial Work
GD	Correspondence Activities
GF	Copying
GG	Calculating
GJ	Document Maintenance
GK	Translating
GM	Registry Activities
GP	Invoicing

Environmental studies

J	ECONOMICS
JA	Economics and Economic History
JB	Comparative Economic Systems
JC	Principles of Economics
JD	Microeconomics
JE	Costs
JF	Demand
JG	Price Mechanism
JH	Market Structure
JJ	Distribution Theory
JK	Economic Conditions
JL	Macroeconomics
JM	Econometrics
JN	Investment and Growth
JP	Monetary Economics
JQ	International Economic Relations
JR	Public Finance
JS	Economic Planning
JU	Local Government Finance
JW	Labour Economics
JZ	TRANSPORT
JZA	Transport
JZB	Land Transport
JZC	Water Transport
JZD	Air Transport
JZE	Space Transport
JZG	Transport Termini
JZH	Vehicles
JZJ	Traffic
JZL	Traffic Studies
JZN	Public Transport (passenger)
JZP	Freight Transport
JZR	Accidents and Accident Prevention
JZS	Navigation
K	INDUSTRIES
KA	Agriculture, Forestry and Fishing Industries
KB	Extractive Industries
KBZ	Manufacturing Industries
KC	Food, Drink and Tobacco Industries
KD	Chemical Industries
KE	Metal Industries
KF	Engineering Industries
KG	Shipbuilding and Marine Engineering
KH	Vehicles Industries
KJ	Other Metal Goods Industries
KK	Textile Industries
KL	Leather and Fur Industries
KM	Clothing and Footwear Industries
KN	Building Materials Industries
KP	Timber and Furniture Industries
KQ	Paper, Printing and Publishing Industries
KR	Other Manufacturing Industries
KS	Construction and Civil Engineering Industries
KT	Power Industries
KU	Water Engineering Industry
KV	Postal and Telecommunications Services
KW	Service Industries
L	BEHAVIOURAL SCIENCES

LA	Behavioural Sciences
LC	Sociology
LE	Population Studies
LG	Social Stratification
LJ	People
LN	Informal Groups
LQ	Formal Organizations
LU	Social Control
LW	Social Administration
LX	Psychology
M	COMMUNICATION
MA	Communication
MC	Information
ME	Communication Skills
MG	Group Communication
MJ	Mass Communication
MP	Communication Media
MS	Signs
MU	Codes of Communication
N	EDUCATION
NA	Education
NB	Education at School
NC	Further Education
ND	Curriculum
NE	Teaching Methods
NF	Teaching Aids
NH	Students' Work
NK	Educational Assessment
NL	Staff
NN	Educational Administration
NR	Careers
P	LAW
PA	Jurisprudence
PB	General and Comparative Law
PC	International Law
PF	Public Law
PG	Private Law
PL	Law and Legal Systems of Europe
PN	Law and Legal Systems of Africa
PQ	Law and Legal Systems of Asia and the Pacific
PT	Religious Legal Systems
PV	Ancient and Medieval Law
Q	POLITICAL SCIENCE
QA	Political Science
QB	The State
QC	Government
QD	Constitutions
QE	Legislation and Legislative Bodies
QG	Administration of Government
QL	International Relations
QM	Dependent Territories
QQ	War
QS	Practical Politics
QU	Local Government
R	SCIENCE AND TECHNOLOGY
RA	Science and Technology
RB	Science
RC	Astronomy
RD	Physics
RE	Chemistry
RF	Geography
RG	Geology
RH	Paleontology
RJ	Biology
RK	Botany
RL	Zoology
RM	Medical Sciences
RN	Technology
S	PHILOSOPHY, LOGIC AND SCIENTIFIC METHOD
SA	Philosophy
SB	Fundamentals of Logic
SC	Conclusions
SD	Logical Calculation
SE	Theory of Knowledge
SF	Logical Standpoints and Trends
SH	Scientific Enquiry
SJ	Scientific Systematization

Analytical techniques

TA	Operational Research
TB	Systems Analysis
TC	Scheduling
TD	Sequencing
TE	Search Theory
TF	Statistical Decision Making
TG	Simulation
TH	Queuing Theory
TJ	Resource Allocation
TK	Mathematical Models
TL	Game Theory
TM	Network Analysis
TN	Heuristics
U	STATISTICS

UA	Statistics
UB	Statistical Evaluation
UC	Statistical Distribution
UD	Sampling
UE	Statistical Analysis
UG	Probability Theory
UH	Estimation
UJ	Statistical Testing
UK	Statistical Dispersion
UL	Statistical Relationships

V	MATHEMATICS

VA	Mathematics
VB	Arithmetic
VC	Algebra
VD	Mathematical Analysis
VF	Homology
VG	Calculus
VH	Potential Theory
VJ	Special Functions
VK	Trigonometry
VL	Geometry
VM	Differential Equations
VN	Integral Equations
VP	Series
VR	Preferred Numbers
VS	Numerical Analysis
VT	Graphical Methods
VU	Slide Rule Methods
VV	Mathematical Programming
VW	Metrology

W	AUTOMATION

WA	Automation
WB	Computers
WC	Data
WD	Input-output Media
WE	Computer Operating Systems
WF	Programming
WG	Programming Language
WH	Computer Installation and Operation

X	ORGANIZATION AND METHODS AND WORK STUDY

XA	Organization and Methods and Work Study
XC	Organization and Methods
XE	Work Study
XG	Method Study
XK	Work Measurement
XP	Ergonomics

Auxiliary schedules

1	People and Occupational Roles
2	Industrial Products and Services (To be used with K.)
3	Common Properties
4	Common Activities
5	Geographical Divisions
6	Time
7	Form Divisions
8	Languages

Note: Valerie Lang is now re-developing and expanding the areas of personnel, labour economics and occupational roles to meet the needs of the Institute of Manpower Studies.

Summary of research undertaken by Aslib, 1966-1971

IN 1966, the Government's Office for Scientific and Technical Information offered to increase its support for Aslib specifically to encourage it to build up a viable research department, to undertake systematic programmes of research into scientific and technical information systems, and to provide consultancy services in this field. In response to an appeal from Lord Kings Norton, then President of Aslib, some twenty member organizations agreed to share with OSTI the cost of this new development during its first three years. The three-year development period ended in December 1969, and an account of the progress made during this period was published in *Aslib Proceedings* for May 1970.

Even as recently as 1966, research into scientific and technical information systems was still a largely unexplored field. The two main problems—in addition to the obvious one of establishing priorities—were, therefore, to recruit and train promising staff, since there was no reservoir of people with ready-made research experience in the subject, and to develop and test research methods. Inevitably, this took time, but good progress was made, and the Government offered increased grants for the further development of the work during the period 1969–71. This support is to be maintained during the grant period 1972–4, provided that members of Aslib also increase their support substantially.

It will therefore be helpful for members to have an up-to-date review of the work of the Research and Development Department, and the earlier summary has been extended to cover the period up to 1971. As before, the summary is grouped under four main heads. The project serial numbers are repeated in the list of references to published work, and to reports submitted or in preparation, which follows the summary.

SUMMARY OF RESEARCH

A. Users' needs for information

Project	*Aim*
1. Study of use made of technical libraries.	To provide basic data as a guide to individual organizations in planning their library and information services. Enables company and other libraries to be planned rationally and economically on the basis of ascertained needs and usage patterns.
2. Study of flow and use of metals information in Britain.	To provide data for rational development of information services on metals, with a view to ensuring efficient and economical services geared to the requirements of users.

Project	*Aim*
3. Study of user reaction to current-awareness publications.	To provide publishers with planning information, so that these publications can be designed to meet the requirements of specialist users and libraries.
4. Study of use of data by chemists.	To provide information on which data compilations and data banks can be planned so as to meet the requirements of user libraries and individual users.
5. Geographical study of science/technology libraries and potential users.	To aid the planning of an efficient national system of science/technology libraries.
B. Library systems and procedures	
6. Bibliographical records in libraries—an integrated analysis of library procedures using forms.	To develop a model as a guide to the design of optimum system(s).
7. Clerical processes in libraries—undertaken in university libraries but applicable in other types.	To test techniques of systems analysis which can be applied in turn to establish efficient clerical processes.
8. Techniques of constructing a thesaurus for retrieval purposes.	To prepare an authoritative guide for libraries and others to the construction of specialized thesauri for keyword indexing and retrieval systems.
9. Specialized information centres.	To prepare a guide, on the basis of case studies (in mass spectrometry, rock mechanics, intestinal absorption, bio-deterioration and bio-medical engineering), to the development and operation of such centres, so as to obtain efficient information services in the difficult, often multi-disciplinary, fields covered.
10. Comparison of current awareness services in a specialized organization.	To assess the relative advantages of manual and computer services, and of keyword and title searches.
11. Classification and coding of data: an analysis of practice in the construction industry.	To assess the current development of product and process coding as a contribution to efficient technical data retrieval.
12. Classification in science information.	To assess its role in a possible world network of scientific information services. (Undertaken for the International Council of Scientific Unions, at its expense.)
13. Cost studies of library and information services.	To develop standard unit costs for processes, usable in system planning.
C. Mechanization of library and information processes	
14. Computer-based loan records for special libraries.	To economize on clerical costs.
15. Computer-printed location records for regional library bureaux.	To simplify and reduce costs of inter-library loans.
16. Computer-typesetting of bibliographical material—using Aslib *Index to Theses* as example.	To cost against the conventional printing of bibliographical material.
17. Basic systems analysis and design of computer-typeset abstracting journals in physics, electrical engineering and associated subjects.	To provide the Institution of Electrical Engineers with the design study on which its computer-set abstracting journals are now based.

Project	*Aim*
18. Feasibility study for integrated information services in agriculture and related subjects.	To explore the provision of multiple services from a single keyboard input, based on the abstracting/indexing operations of the Commonwealth Agricultural Bureaux.
19. Feasibility study for computer aid to information services of House of Commons Library.	To improve information provision for Members of Parliament.
20. Feasibility study for use of computer in production of index journal.	To explore the possibility of more economic and rapid publication of *Zoological Record.*
21. Review of generation and printing of indexes by computer.	To provide prospective users with a guide to the potentialities and availability of computer programs.

D. Documentary sources of information

22. Documentation of documentation; studies leading to the publication of *Library and Information Science Abstracts.*	To provide librarians and information officers with an efficient current-awareness service in their own subject.
23. Evaluation of British scientific journals.	To provide data enabling libraries to base their journal subscriptions on rational selection and, in the long run, to guide rational publication of scientific journals.
24. Tests on abstracting journals.	To assess their coverage and indexing efficiency.
25. Use of social science literature as indicated by citations.	To provide knowledge of the pattern of literature use in the social sciences, to guide national provision of library resources in this field.
26. Review of research on primary communications.	To aid in the identification of further problem areas needing investigation.

PUBLICATION AND AVAILABILITY OF RESULTS OF RESEARCH SUMMARIZED ABOVE

Project

1. Slater, Margaret and Fisher, Pamela. *Use made of technical libraries.* Aslib Occasional Publication No. 2, 1969.
2. Vickery, Brian and others. *Metals information in Britain.* Aslib research report, 1969, available on loan from National Lending Library as OSTI deposited report 5035.
3. (a) Slater, Margaret and Keenan, Stella. *Results of questionnaire on current awareness methods used by physicists prior to publication of Current Papers in Physics.* 1967. Available from Institution of Electrical Engineers.
   (b) Slater, Margaret and Keenan, Stella. Methods of conducting a study of physicists' requirements in current awareness. Proceedings of American Documentation Institute Annual Meeting 1967, p. 63–7.
   (c) Slater, Margaret and Keenan, Stella. *Current Papers in Physics: user study.* 1968. Available from Institution of Electrical Engineers.
   (d) Slater, Margaret and Keenan, Stella. *Use made of Current Papers in Physics.* 1968. Available from Institution of Electrical Engineers.
   (e) Slater, Margaret and Keenan, Stella. Current awareness needs of physicists. *Journal of Documentation,* vol. 24, June 1968, p. 98–106.
   (f) Slater, Margaret. *Analytical Abstracts: user reaction study.* Aslib research report, 1968, commissioned for the Society for Analytical Chemistry, which has published a summary.
   (g) Presanis, Alexandra. *British Journal of Industrial Medicine, current awareness section: user survey.* Aslib research report, 1971, commissioned for the journal.

4. Mountstephens, Brenda; Osborn, Averil; and Slater, Margaret. *Quantitative data in science and technology*. Aslib Occasional Publication No. 7, 1971. A second report is in preparation.

5. Presanis, Alexandra. *The distribution of scientific and technical libraries and users in Great Britain*. Aslib Occasional Publication No. 6, 1971.

6. (a) Thomas, Pauline and East H. *The use of bibliographic records in libraries*. Aslib Occasional Publication No. 3, 1969.
   (b) Thomas, Pauline. *Procedural model for the use of bibliographic records in libraries*. Aslib Occasional Publication No. 4, 1970.
   (c) Thomas, Pauline. Tasks and the analysis of library systems. *Aslib Proceedings*, vol. 22, July 1970, p. 336–43.
   (d) Thomas, Pauline. *Task analysis of library operations*. Aslib Occasional Publication No. 8, 1971.

7. (a) Analysis of library processes. *Journal of Documentation*, vol. 26, March 1970, p. 30–45.
   (b) Gilchrist, A. Work study in libraries. *Journal of Librarianship*, vol. 2, April 1970, p. 126–38.

8. Gilchrist, A. *The thesaurus in retrieval*. Aslib, 1971.

9. (a) Robertson, S. E. and Reynolds, Rose. *Five specialised information centres*. OSTI Report 5050, 1969. Available from the Office for Scientific and Technical Information.
   (b) Martyn, J. *Evaluation of specialised information centres*. *Information Scientist*, vol. 4, September 1970, p. 123–34.

10. *Evaluation of an SDI system based on Nuclear Science Abstracts*. Atomic Energy Research Establishment report R 6746, 1971, by G. Olive, S. Datta and J. E. Terry.

11. (a) Gilchrist, A. and Gaster, Kathleen. *Information systems relating to the construction industry*. Building Research Station Current Paper, 1969.
    (b) Gilchrist, A. Data co-ordination in the construction industry. *Aslib Proceedings*, vol. 22, April 1970, p. 162–6.

12. Report submitted to International Council of Scientific Unions, 1969.

13. (a) Robertson, S. E.; Reynolds, Rose; and Wilkin, Anne. Standard costing for information systems: background to a current study. *Aslib Proceedings*, vol. 22, September 1970, p. 452–7.
    (b) Reynolds, Rose. *Selective bibliography on measurement in library and information services*. Aslib, 1970.
    (c) Gilchrist, A. Cost-effectiveness. *Aslib Proceedings*, vol. 23, September 1971, p. 3–10.

14. Wilson, C. W. J. and Weyman, A. AERE library, computer-based loans systems: report of a feasibility study. Report AERE-M 2000, 1968. Available from Atomic Energy Research Establishment library. The implementation of the system is recorded in AERE Report M-2375, 1971.

15. Reports submitted to Office for Scientific and Technical Information.

16. (a) Weyman, A. and Davis, J. Computer-aided typesetting. *Aslib Proceedings*, vol. 19, May 1967, p. 146–9.
    (b) Weyman, B.; Weyman, A.; and Davis, J. Computer typesetting the 'Aslib Index to Theses'. *Program*, vol. 6, January 1972, p. 36–59.

17. (a) East, H. and Smith, J. R. Information services in physics. In Ciba Foundation symposium on *Communication in science*. London: Churchill, 1967.
    (b) East, H. Designing a computer-aided information service for physicists with minimum concessions to the machinery. *Information Scientist*, vol. 1, 1967, p. 107–17.
    (c) East, H. and Weyman, A. Study of the source literature of plasma physics. *Aslib Proceedings*, vol. 21, April 1969, p. 160–71.
    (d) Anthony, L. J., East, H. and Slater, Margaret. The growth of the literature of physics. *Reports on Progress in Physics*, vol. 32, 1969, p. 709–67.

18. Report (confidential) presented to Commonwealth Agricultural Bureaux, 1969.

19. Report (confidential) presented to House of Commons Library, 1971.

20. Report (confidential) presented to Zoological Society, 1970.

21. Report to be published by Aslib, 1972.

22. (a) Gilchrist, A. Documentation of documentation. *Aslib Proceedings*, vol. 18, March 1966, p. 62–80.

(b) Gilchrist, A. Library and Information Science Abstracts: a brief progress report. *Aslib Proceedings*, vol. 21, August 1969, p. 325–7.
(c) Gilchrist, A. and Presanis, Alexandra. Library and Information Science Abstracts: the first two years. *Aslib Proceedings*, vol. 23, May 1971, p. 251–6.

23. Martyn, J. and Gilchrist, A. *An evaluation of British scientific journals.* Aslib Occasional Publication No. 1, 1968.
24. Martyn, J. and Slater, Margaret. Tests on abstracts journals. *Journal of Documentation*, vol. 20, December 1964, p. 212–35; and vol. 23, March 1967, p. 45–70.
25. Earle, Penelope and Vickery, B. C. Social science literature use in the UK as indicated by citations. *Journal of Documentation*, vol. 25, June 1969, p. 123–41.
26. Hills, Jacqueline. *A review of the literature on primary communications in science and technology.* Aslib Occasional Publication No. 9, 1972. In preparation.

Other relevant publications

(a) Coblans, H. The mechanisation of documentation. In Ciba Foundation symposium on *Communication in science.* London: Churchill, 1967.
(b) Vickery, B. C. Bibliographic description, arrangement and retrieval. *Journal of Documentation*, vol. 24, March 1968, p. 1–15.
(c) Slater, Margaret. Meeting the users' needs within the library. In *Trends in Special Librarianship.* London: Bingley, 1968.
(d) Vickery, B. C. Analysis of information. In *Encyclopedia of Library and Information Science.* New York: Dekker, 1968.
(e) East, H. The development of SDI services. *Aslib Proceedings*, vol. 20, November 1968, p. 482–91.
(f) Earle, P. and Vickery, B. C. Subject relations in science/technology literature. *Aslib Proceedings*, vol. 21, June 1969, p. 237–43.
(g) Vickery, B. C. Indicators of the use of periodicals. *Journal of Librarianship*, vol. 1, 1969, p. 170–82.
(h) Martyn, J. Evaluation of information handling systems. *Aslib Proceedings*, vol. 21, August 1969, p. 317–24.
(i) Martyn, J. and Vickery, B. C. The complexity of the modelling of information systems. *Journal of Documentation*, vol. 26, September 1970, p. 204–20.
(j) East, H. Current research in mechanization. *Aslib Proceedings*, vol. 22, December 1970, p. 617–28.
(k) Vickery, B. C. Methodology in research. *Aslib Proceedings*, vol. 22, December 1970, p. 597–606.
(l) Vickers, P. Information retrieval in the Foreign and Commonwealth Office. *O & M Bulletin*, vol. 26, May 1971, p. 85–92.
(m) Vickery, B. C. Structure and function in retrieval languages. *Journal of Documentation*, vol. 27, June 1971, p. 69–82.
(n) Vickery, B. C. *Techniques of information retrieval.* Butterworths, London, 1970.

Letter to the Editor

Dear Sir,

THE FIRST ASLIB CONFERENCE

I would like warmly to congratulate Mr Ashworth on his paper, presented to the 45th Aslib Conference at Darmstadt, and published in your issue of December 1971. As far as my personal recollections are involved, it is both comprehensive and accurate.

I also confirm his statement that the promoters of the first conference in 1924 had no desire or intention to form a new body, but at the concluding session the conference gave them no option but to form the Standing Committee. The promoters were primarily interested as users rather than as custodians of information. The intervening period has of course produced an entirely new situation.

One factor in the decision to incorporate followed from the financial support of the Carnegie Trustees, who were represented at the first conference by their Secretary, Lt. Col. J. M. Mitchell. It was intended in part to aid the preparation and publication of the first *Aslib Directory*, published in 1928 following incorporation in 1927, necessary in order legally to hold the property.

None of the promoters could have foreseen or prophesied the remarkable development of Aslib itself and its field since 1924, which now to me seems a long time ago.

Yours sincerely,
JAMES G. PEARCE

17 Abbey Road,
Harborne,
Birmingham, B17 0JT.

CURRENT AWARENESS LIST

Recent additions to the Aslib library catalogue are broken down into twelve broad groups, whose coverage is indicated below. These groups are not mutually exclusive but it is hoped that users will find them helpful in scanning for new items of interest.

User Studies
Analyses of information-seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory.

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject Organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies; reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies; directories.

JANET WALKLEY
Librarian

CURRENT AWARENESS LIST

*Items are available in the Aslib Library and may be borrowed unless marked * to indicate reference copies.*

User Studies

SCHWUCHOV, WERNER

Benutzeranalysen als Grundlage fur die Organisation von Informations- und Dokumentationseinrichtungen.
Nachrichten fur Dokumentation, vol.22, no.6, December 1971, p.237–40.
User studies as a basis for the organization of information and documentation centres.

FUHLROTT, ROLF

Informationsbedarf und Informationsgewohnheiten von Ingenieurwissenschaftlern: eine empirische Untersuchung an der Fakultat Bauingenieurwesen der Universitat Karlsruhe. Cologne: Greven, 1971. 3 7743 0538 2.
89p. (Arbeiten aus dem Bibliothekar-Lehrinstitut des Landes Nordrhein-Westfalen, no. 38)

HÖHNE, HERBERT

Nutzerbefragung in der gesellschaftswissenschaftlichen Forschung.
Informatik, vol.18, no.6, 1971, p.53–5.
Investigation of information needs in the field of social science research.

LINE, MAURICE B.

Information and the social scientist.
SSRC Newsletter, no.13, November 1971, p.11–13.
Summary of the Investigation into Information Requirements of the Social Sciences.

LINE, MAURICE B. *and others*

Investigation into information requirements of the social sciences: research report no 5: the research procedures of social scientists. Bath: Bath University Library, November 1971.
[ii], 23p. (OSTI report no.5106)

HYMAN, RICHARD J.

Access to library collections: summary of a documentary and opinion survey on the direct shelf approach and browsing.
Library Resources and Technical Services, vol.15, no.4, Fall 1971, p.479–91.
An opinion questionnaire, rephrasing hypotheses from the literature, was sent to practitioners and teachers of librarianship. Findings are summarized.

APTED, S. M.

General purposive browsing.
Library Association Record, vol.73, no.2, December 1971, p.228–30.
General browsing, general purposive browsing and specific browsing; differences in browsing habits, evaluation of browsing.

URQUHART, JOHN A. *and* SCHOFIELD, J. L.

Measuring readers' failure at the shelf.
Journal of Documentation, vol.27, no.4, December 1971, p.273–86.
The methodology and results of a survey at Cambridge University Library into non-availability of books sought.

KIRK, THOMAS

A comparison of two methods of library instruction for students in introductory biology.
College and Research Libraries, vol.32, no.6, November 1971, p.465–74.

Communication and Knowledge

WYATT, H. V.

When does information become knowledge?
Nature, vol.235, no.5333, 14th January 1972, p.86–9.
Studies the fate of a key paper in molecular biology to elucidate the factors which determine the transformation of information into knowledge.

LAMBERTON, D. M.

Economics of information and knowledge: selected readings. Harmondsworth: Penguin, 1971. 014 08 0248 7.
384p.

Information Processing Systems

BIBLIOGRAPHICAL services throughout the world.
Bibliography, Documentation, Terminology, vol.11, no.6, November 1971, p.249–69.
Updates the handbook 'Bibliographical Services throughout the world 1960–64' by P. Avicenne.

WOLFE, J. N. *and others*

The economics of technical information systems: a study in cost-effectiveness, by J. N. Wolfe, D. Brydon, A. Scott, R. Young and associates: information consultant: T. M. Aitchison. Edinburgh: Edinburgh University, [1971?]
3v.

KALVINSKAS, LOUANNE A.

Current awareness bulletin, its preparation and use in a non-automated library.
Special Libraries, vol.62, no.9, September 1971, p.363–8.
Systems at Avery Products Corporation.

WATSON, P. G. *and* BRIGGS, R. B.
Computerized information services for the university community.
Information Storage and Retrieval, vol.8, no.1, February 1972, p.21–33.
Answers to problems of computerized information services in the medium-to-large university.

KING, DONALD W. *and* NEEL, PEGGY W.
Cost effectiveness of on-line retrieval system [sic]. Rockville (Md.): Westat Research, February 1971.
13p. (ED 046 460)

MCCARN, D. B.
Networks with emphasis on planning an on-line bibliographic access system.
Information Storage and Retrieval, vol.7, no.6, December 1971, p.271–9.
Comments on networks and describes a specific network: the on-line medical information retrieval system, AIM-TWX, operated by the Lister Hill National Center for Biomedical Communications.

NEGUS, A. E. *and* HALL, J. L.
Towards an effective on-line reference retrieval system.
Information Storage and Retrieval, vol.7, no.6, December 1971, p.249–70.
Describes the RIOT on-line retrieval system at Culham Laboratory, and its 2 tests, including one on the POLLS (Parliamentary On-Line Library Study) data base.

COWARD, R. E.
MARC and local systems.
Program, vol.5, no.4, October 1971, p.239–52.
Discusses 3 problems: (a) the currency of MARC; (b) the size of a MARC file; (c) the availability of MARC software.

PAISLEY, WILLIAM
Improving a field-based 'ERIC-like' information system.
JASIS, vol.22, no.6, Nov.–Dec. 1971, p.399–408.
The achievements and weaknesses of ERIC (Educational Resources Information Center) as a model for other information systems.

GREAT BRITAIN. Department of the Environment. Directorate of Research and Information.
An information system for the construction industry: final report of the working party on data co-ordination. London: HMSO, October 1971. 11 670 467 5
vii, 55p.

SESSIONS, VIVIAN S. *and* SLOAN, LYNDA W.
Urbandoc: a bibliographic information system: demonstration report. New York: New York University. Graduate Division, 1971.
vi, [166]p. (Urbandoc-71-1)

SESSIONS, VIVIAN S. *and* SLOAN, LYNDA W.
Urbandoc: a bibliographic information system: technical supplement 1: general manual. New York: New York University. Graduate Division, 1971.
viii, [260]p. (Urbandoc-71-2)

SESSIONS, VIVIAN S. *and* SLOAN, LYNDA W.
Urbandoc: a bibliographic information system: technical supplement 2: operations manual. New York: New York University. Graduate Division, 1971.
vi, 243p. (Urbandoc-71-3)

PITTS, G. *and* PARKER, C. C.
International Symposium [on] Information Systems for Designers: the proceedings of the meeting held at the University, 6–7 July 1971. Southampton: Southampton University. Department of Mechanical Engineering, 1971.
1v. (var.pag.)

COOK, C. E. *and others*
CAPRI: a computer aided personal reference index system for use by individual research workers and groups. Aldermaston: AWRE, November 1971. 855180 13 7
48p. (AWRE 063/71)

D'OLIER, J. H. *and* DUSOULIER, N.
Bulletin Signalétique mechanization: the PASCAL system.
Program, vol.5, no.4, October 1971, p.228–38.
System to assist traditional needs of scientists and engineers and users having little time to gather information.

EDWARDS, TOM
LISA and the comprehensive control of library and information science literature.
International Library Review, vol.4, no.1, January 1972, p.67–70.
Problems of resources and funding for a small-scale information service.

WASSERMAN, PAUL *and* LYBECK, PAULINE
Documentation Abstracts, Inc.
Special Libraries, vol.62, no.9, September 1971, p.398–9.
Development of 'Information Science Abstracts'.

KOCH, H. WILLIAM
Current physics information.
Science, vol.174, no.4012, 26th November 1971, p.918–22.
The American Institute of Physics project

to issue a selection of physics journals in microform, together with advance abstracts, title index, tape index.

VANCE, DAVID *and* HELLER, JACK

Structure and content of a museum data bank. *Computers and the Humanities*, vol.6, no.2, November 1971, p.67–84. System developed between 1967 and 1970 by the Museum Computer Network.

LAND, FRANK

Survey archive data banks. *SSRC Newletter*, no.13, November 1971, p.15–18. Report compiled after visiting major data banks in America and Europe.

Language and Indexing

*DEHNHARD, HANS

Aufbau und Benutzung eines DK—Thesaurus: Probleme und Moglichkeiten der Sachkatalogisierung mit Hilfe der elektronischen Datenverarbeitung. Bochum: Bochum Universitatsbibliothek, 1971. 59p.

*DEUTSCHES KRANKENHAUSINSTITUT *and* BERLIN TECHNISCHE UNIVERSITAT. Institut fur Krankenhausbau.

Thesaurus Krankenhauswesen: alphabetischer Teil. Düsseldorf: the Institute, 1971. vi, 143p.

*O.E.C.D.

International Road Research Documentation (I.R.R.D.): thesaurus 1972: numerical list and English arrowed diagrams. [Paris?]: the Organization, 1971. 1v. (var.pag.)

SIKORSKI, LECH

Die Struktur eines einheitlichen Thesaurus fur verschiedene-Industriezweige: am Beispiel des Thesaurus 'Landmaschinen und Mechanisierung der Landwirtschaft'. *Informatik*, vol.18, no.6, 1971, p.23–6. Structure of a uniform thesaurus for various branches of industry; illustrated by the example of the 'Thesaurus for Agricultural Machinery and Mechanization of Agriculture'.

TOMA, EUGENIU

The structure of the EURATOM-thesaurus. *Journal of Documentation*, vol.27, no.4, December 1971, p.267–72. An analysis of the rank-frequency distribution of the EURATOM-thesaurus.

*WILLIAMS, B. J. S.

Thesaurus of micrographic terms. 2nd ed. Hatfield: National Reprographic Centre for Documentation, 1972. 85267-033-8 [ii], 42p.

LANCASTER, F. W.

Commentary on 'Evaluation of Indexing'. *Special Libraries*, vol.62, no.10, October 1971, p.439–41. Commentary on a series of articles by Masse Bloomfield (Special Libraries.—Oct. 1970–Feb. 1971).

BLOOMFIELD, MASSE

The author replies. *Special Libraries*, vol.62, no.10, October 1971, p.441–8. Reply to commentary by F. Lancaster on Bloomfield's series of articles on indexing.

THOMAS, G., *and* WHITEHALL, T.

A KWIC-KWOC double index with manual keyword selection. *Program*, vol.5, no.4, October 1971, p.211–19. The index developed at Brooke Bond's Liebig Research Centre.

DATAFLOW SYSTEMS

An introduction to indexing and abstracting for technical information systems. Bethesda (Md.): the Company, 1971. [iii], 64p. (Dfs report 839)

HELMUTH, NANCY A.

The use of extracts in information services. *JASIS*, vol.22, no.6, Nov.–Dec. 1971, p.382–9. Surveys use of extracts, reviews the literature and suggests guidelines.

WELLISCH, HANS

Documentation-in-source for library and information science. *Library Resources and Technical Services*, vol.15, no.4, Fall 1971, p.439–51. Standards for the bibliographical format of abstracts should be compiled by the American National Standards Institute.

FINLAY, F.

Translating. London: Teach Yourself Books, 1971. 0 340 12468 7 177p.

Classification and Cataloguing

BRYANT, PHILIP, *and* LINE, MAURICE

Cataloguing and classification at Bath University Library: on the track of white elephants and golden retrievers. *Library Association Record*, vol.73, no.12, December 1971, p.225–7. Production of a machine-readable 'mini-catalogue'; development of a UDC system which truncates longer classification numbers for shelf arrangement whilst preserving the full numbers for subject retrieval.

BRITISH STANDARDS INSTITUTION
Universal decimal classification: English full edition: 4th international edition: UDC 355/359: military art and science, national defence, armed forces.
London: the Institution, 1971 580-06904-4
34p. (BS 1000[355/359]: 1971; FID publication no. 179)

BRITISH STANDARDS INSTITUTION
Universal decimal classification: English full edition: 4th international edition: UDC 661: chemicals (fine, heavy etc.)
London: the Institution, 1971 580-06555-3
38p. (BS 1000[661]: 1971; FID publication no.179)

BRITISH STANDARDS INSTITUTION
Universal Decimal classification: English full edition: 4th international edition: UDC 663: beverages, stimulants: UDC 664: manufacture and preservation of solid foods. London: the Institution, 1971. 580-06876-5
47p. (BS 1000[663/664]: 1971; FID publication no. 179)

BRITISH STANDARDS INSTITUTION
Universal decimal classification: English full edition: 4th international edition: UDC 8: language, linguistics, literature. London: the Institution, 1971. 580-06753-X
30p. (BS 1000[8]: 1971; FID publication no.179)

PATENT OFFICE
Structure of the classification key: operative from Specification 1,250,001.
London: the Office *for* HMSO, 1971.
13p.

SOPHANODORN, KANCHANA
Problems of the National Library of Medicine classification for serials.
Library Resources and Technical Services, vol.15, no.4, Fall 1971, p.452-7.
Alterations to the NLM classification scheme for serials are suggested as well as recommendations for improved numbering procedures.

MASSONNEAU, SUZANNE
The main entry and the book catalog.
Library Resources and Technical Services, vol.15, no.4, Fall 1971, p.499-512.
Excerpts from the book catalogue of the J. Henry Meyer Memorial Library, Stanford University are used as illustrations.

BARNETT, C. C.
Reports cataloguing in the Aircraft Research Association Library.
Program, vol.6, no.1, January 1972, p.60-73.
The change from card catalogue KWOC listing.

COX, CARL T.
The cataloguing of nonbook materials: basic guidelines.
Library Resources and Technical Services, vol.15, no.4, Fall 1971, p.472-8.
Demands uniformity and consistency in cataloguing.

JOHNSON, JEAN THORNTON *and others*
AV cataloguing and processing simplified.
Raleigh (N.C.): Audiovisual Catalogers, Inc., 1971.
257p.

RISTOW, WALTER, WALTER W. *and* CARRINGTON, DAVID K.
Machine-readable map cataloging in the Library of Congress.
Special Libraries, vol.62, no.9, September 1971, p.343-52.
MARC system provides the medium through which the cataloguing record is converted to machine-readable form.

Mechanization

BECKER, JOSEPH
Trends in library technology.
Special Libraries, vol.62, no.10, October 1971, p.429-34.
Examines developments and trends in various technologies relevant to library usage.

CHAUVEINC, M.
Automation in French libraries.
Program, vol.5, no.4, October 1971, p.179-90.
Use of computers for information retrieval, housekeeping and cataloguing.

MENKUS, BELDEN
Retention of data for the long term.
Datamation, vol.17, no.18, 15th September 1971, p.30-2.
Routine conversion of data archives tape contents to microfilm is the key to long term retention of machinable data.

MCALLISTER, CARYL
On-line library housekeeping systems: a survey.
Special Libraries, vol.62, no.11, November 1971, p.457-68.
Covers all known on-line systems operational in North America with one or more of the following functions: acquisitions, cataloguing, circulation, serials control.

ODDY, R. N.
Computer processing of library files at Durham University: an ordering and cataloguing facility for a small collection using an IBM 360/67 machine. Durham: Durham University Library, 1971. 900009-01-2.
vii, 202p. (Durham University Library publication no.7)

ASLIN, C. J.
University of East Anglia computer produced short-title catalogue.
Program, vol.5, no.4, October 1971, p.204–10.
An STC index produced from the entries prepared for a computerized loans system.

CORBETT, LINDSAY, *and* GERMAN, JANICE
AMCOS project stage 2: a computer aided integrated system using BNB MARC literature tapes.
Program, vol.6, no.1, January 1972, p.1–35.
AMCOS system at AWRE, Aldermaston performs book processing requirements.

EVANS, A. J., *and* WALL, R. A.
Serials mechanization: the current position in the U.K.
Program, vol.5, no.4, October 1971, p.220–7.
Aims of serial mechanization; UK developments and the future.

LINGENBERG, W.
Comparison of computerized loans systems in the Federal Republic of Germany.
Program, vol.5, no.4, October 1971, p.191–203.
Tabulates details of systems in 6 libraries.

Subject Organization

KREUZER, KARL F.
Law libraries and law collections in the Federal Republic of Germany.
Law Librarian, vol.2, no.3, December 1971, p.39–42.
Briefly surveys the main categories of library.

PELETIER, W. M.
Law libraries in the Netherlands.
Law Librarian, vol.2, no.3, December 1971, p.37–8.
Briefly surveys the main categories of library.

BIODETERIORATION INFORMATION CENTRE
Annual report (6th), 1970–1971.
Birmingham: the Centre, [1971].
[11]p. (OSTI report 5105)

ZENTRALSTELLE FUR ATOMKERNENERGIE—DOKUMENTATION
ZAED: activities and services.
Leopoldshafen: the Establishment, 1971.
8p.

BOTTLE, R. T. *and* WYATT, H. V.
The use of biological literature.
2nd ed. London: Butterworths, 1971. 0 408384115
xii, 379p.

KNELL, K. A.
Information retrieval from the engineering literature: basis of lectures to members of the Cambridge University Engineering Department.
Cambridge: Cambridge University Engineering Department, 1971.
[ii, 31]p.

PEMBERTON, JOHN E.
The national provision of printed ephemera in the social sciences: a report prepared for the Social Science and Government Committee of the Social Science Research Council. Coventry: Warwick University Library, 1971. 903220-00-8
56p. (Occasional publications no.1)

ZISKIND, SYLVIA
Reference readiness: a manual for librarians and students. London: Bingley, 1971. 85157-482-3
xiii, 310p.

Reprography

NATIONAL REPROGRAPHIC CENTRE FOR DOCUMENTATION
Directory of commercial microfilm services in the United Kingdom. 2nd ed. Hatfield: the Centre, 1971. 85267 032 X
11p.

BUSINESS EQUIPMENT TRADE ASSOCIATION
Microfilm: the methods and the equipment. London: the Association, [1971]
[ii], 46p.

DE LAVETTE, F. P. RENARDEL
Miniaturizing of information.
Microfiche Foundation Newsletter, no.23 October 1971, p.13–6.
Microfilm techniques to store mass information.

KELLY, G. J. *and others*
What microfilm does.
Australian Special Libraries News, vol.4, no.6, November 1971, p.92–100.
Discusses microfilm formats, microfilm cameras, types of originals, large volume microfilming.

ULTRAMICROFICHE.
Microfiche Foundation Newsletter, no.23, October 1971, p.2–3.
Editorial; scope and future development of ultramicrofiches.

A CHALLENGE to microfilm.
British Printer, November 1971, p.69–70.
Describes a new microprinting process which is cheaper than microfilming for large-scale information storage and retrieval.

KUNDORF, WOLDEMAR
Standardisierung der Mikrofilmtechnik.
Informatik, vol.18, no.6, 1971, p.37–45.
Standardization in the field of microfilm technology.

*PEETERS-HOUTERMAN, H. F.
Bibliography on microfiche: cumulative edition. Delft (The Netherlands): Microfiche Foundation, 1971.
35p. (Publications on the microfiche no.12)

NATIONAL MICROFILM ASSOCIATION
Proposed industry standard: facsimile transmission of microfilmed documents in 35 mm 8-UP format. Silver Spring (Md.): the Association, 1971.
8p.

Printing and Publishing

WEYMAN, B. *and others*
Computer typesetting the 'Aslib Index to Theses'.
Program, vol.6, no.1, January 1972, p.36–59.
Results of a programme of research in the field of computer-aided typesetting.

SULJAK, NEDJELKO D.
Copyright and the question of authorship.
Library Resources and Technical Services, vol.15, no.4, Fall 1971, p.513–21.
Basic concepts of copyright law applied to literary or artistic work.

UNIVERSAL Copyright Convention as revised at Paris on 24th July 1971.
Copyright Bulletin, vol.5, no.3, 1971, p.3–20.
Text of revised convention.

Administration and Management

FRÖHLICH, GERHARD
Flussbilder als Hilfsmittel bei der Rationalisierung bibliothekarischer Arbeiten in wissenschaftlichen Fachbibliotheken.
Zentralblatt für Bibliothekswesen, vol.85 no.12, December 1971, p.725–32.
Flow charts help rationalize work in scientific libraries.

LEIMKUHLER, F. *and* COOPER, MICHAEL D.
Cost accounting and analysis for university libraries.
College and Research Libraries, vol.32, no.6, November 1971, p.449–64.

BRYAN, HARRISON
A preliminary subject analysis of library costs.
Australian Academic and Research Libraries, vol.2, no.5, December 1971, p.162–7.
Analysis of library expenditure at Sydney University.

STONE, ELIZABETH
New directions in staff development: Moving from ideas to action: the papers of a one-day conference held in Detroit, Michigan, 28 June 1970. Chicago: American Library Association. Library Administration Division, 1971. 0-8389-3130-8
iii, 66p.

KEMPER, ROBERT
Library management: behaviour-based personnel systems (BBPS): a framework for analysis.
Littleton (Colo.): Libraries Unlimited, 1971. 87287 0367
104p.

ROBERTSON, S. E.
The Institute's third renumeration survey.
Information Scientist, vol.5, no.4, December 1971, p.149–60.
Part 1: Questionnaire and results.
Part 2: Towards a predictive model.

MILBY, T. H.
Sources of professional staff in selected academic libraries.
College and Research Libraries, vol.32, no.6, November 1971, p.442–8.
Advantages and disadvantages of selecting staff locally and the means of improving communication between library administration and staff.

WYNAR, BOHDAN S.
Library acquisitions: a classified bibliographic guide to the literature and reference tools. 2nd ed.
Littleton (Colo.): Libraries Unlimited, 1971. 87287-035-9
xi, 239p.

CAUFFMAN, D. HUGHES
Color code system of new law library.
Special Libraries, vol.62, no.10, October 1971, p.438–9.
Library stack identification system at the Theodore F. Jenkins Memorial Law Library, Philadelphia.

ROBERTS, MATT
The role of the librarian in the binding process.
Special Libraries, vol.62, no.10, October 1971, p.413–20.
The fundamentals of binding are described so that librarians can exert more control over the proper binding of books.

WOODS, BILL M.
Map librarianship: a selected bibliography. 3rd ed. [Woodbridge (N.J.)]: New Jersey Library Association, 1971.
20p.

WIEST, DONALD G.
Film: the durable medium.
Special Libraries, vol.62, no.11, November 1971, p. 475–80.
Problems of film preservation, with bibliography.

HALL, DAVID
Phonorecord preservation: notes of a pragmatist.
Special Libraries, vol.62, no.9, September 1971, p.357–62.
Storage, shelving, handling, use.

SOUTH AFRICA UNIVERSITY. Library.
Preliminary report on an experimental project to supply recommended books to students in microfiche form. Pretoria: the Library, 1971.
10p.

Library Systems

ROSS, T. G.
NLL staff library.
NLL Review, vol.2, no.1, January 1972, p.14–16.
Describes the collection of information science literature and bibliographies, encyclopaedias and dictionaries in science, technology and the social sciences for NLL staff reference purposes.

RALSTON, A.
The library lobby.
College and Research Libraries, vol.32, no.6, November 1971, p.427–31.
The university library considered as a university-wide resource and as a research facility analogous to laboratory equipment.

LIBRARY ASSOCIATION. Colleges of Technology and Further Education Section.
College libraries: recommended standards of library provision in colleges of technology and other establishments of further education. 2nd rev. ed. London: Library Association, 1971. 85365 205 8
15p.

COUNCIL OF EUROPE. Committee for Higher Education and Research.
Co-operation between European research libraries: constitution for the Association of European Research Libraries. Strasbourg: the Committee, 1971.
4p. (CCC/ESR(71)2 revised)

COUNCIL OF EUROPE. Committee for Higher Education and Research.
Meeting of experts on co-operation among European research libraries, Strasbourg, 17–18 March 1971. Strasbourg: the Committee, 1971.
26p. (CCC/ESR(71)27)
Minutes of the meeting to establish the Association of European Research Libraries (LIBER)

WESSEX REGIONAL LIBRARY AND INFORMATION SERVICE
The Wessex Regional Library and Information Service: some significant factors in its development and prospects. 2nd ed. Southampton: the Regional Library, November, 1971.
7p.

OTTO, FRIEDA
Erfahrungen mit zentraler Katalogisierung in wirtschafts- und sozialwissenschaftlichen Bibliotheken.
Inspel, vol.6, no.3 & 4, July–October 1971, p.89–92.
The centralized cataloguing system for economics and social sciences libraries operated by the library of the Institut fur Weltwirtschaft in Kiel.

MORSZTYNKIEWICZ, IRENA
Some problems of special and universal library co-operation in scientific, technical and economic information.
Inspel, vol.6, no.3 & 4, July–October 1971, p.84–9.
The picture in Poland.

FEUILLEBOIS, G.
Co-ordination, et co-opération des bibliothèques générales et spécialisées dans l'information scientifique et technique.
Inspel, vol.6, no.3 & 4, July–October 1971, p.93–8.
The picture in France.

SPICER, ERIK J.
Co-ordination and co-operation of special and general libraries in scientific and technical information in Canada.
Inspel, vol.6, no. 3 & 4, July–October 1971, p.69–72.
Emphasizes the roles of the National Library and National Science Library.

COOK, JOHN
Australia and the International Exchange of library materials.
Australian Academic and Research Libraries, vol.2, no.5, December 1971, p.158–162.
Results of a survey of state and university libraries.

SHARMAN, ROBERT C.
Co-ordination and co-operation of special and general libraries in scientific and technical information. (Australia)
Inspel, vol.6, no.3 & 4, July–October 1971, p.78–84.
Organizations and systems in inter-library co-operation.

URQUHART, D. J.
The design of forms for international inter-library service.
NLL Review, vol.2, no.1, January 1972, p.11–13.
Suggests replacing the IFLA form, which makes additional work for issuing libraries, with the type used by the NLL.

Professional Activity

ZSIDAI, JÓZSEF
Die Probleme des fachbibliothekarischen Berufs in Ungarn.
Inspel, vol.6, no.3 & 4, July–October 1971, p.72–7
Problems concerning the profession of special librarianship in Hungary.

CARROLL, FRANCES LAVERNE
Internationalism in education for librarianship.
International Library Review, vol.4, no.1, January 1972, p.103–26.
Goals of international education.

GOLDHOR, HERBERT
Education for librarianship: the design of the curriculum of library schools. Urbana (Ill.): Illinois University. Graduate School of Library Science, 1971. 0-87845-033-5
ix, 195p.

MILLER, EDWARD P. *and* LUTZ, RAYMOND P.
A unique program in library education.
Special Libraries, vol.62, no.9, September 1971, p.353–6.
Interdisciplinary program at the University of Oklahoma.

ALLARD, KAY *and others*
An AV Workshop approach to teaching the use of CA indexes.
Special Libraries, vol.62, no.10, October 1971, p.435–7.
Describes AV workshop developed by special and academic librarians to train students, users and staff in systematic approaches to using CA indexes.

IFLA
Directory 1972. The Hague: the Federation, [1971].
60p.

WILSON, LESLIE
The work of Aslib
Nachrichten für Dokumentation, vol.22, no.6, December 1971, p.265–8.
Development and organization.

SCIENTIFIC BOOKS,

LIBRARIES AND COLLECTORS

3rd edition by

John L. Thorton & R. I. J. Tully

Scientific publications and their patrons from before the start of printing to the present. An outstanding 85-page bibliography is complementary to a fine piece of scholarly research.

£7 (£5.60 to L.A. members)

THE LIBRARY ASSOCIATION

MEMBERS' ADVERTISEMENTS

Translations services

MEDICAL AND HIGHLY SPECIALIZED SCIENTIFIC TRANSLATIONS.S.M. Bonnekamp, FIL, Member of the Translators' Guild (Med. Science & Lit.), 47 Firs Close, Muswell Hill, London N10. Tel. 01-883 3962 during office hours. After office hours an automatic telephone answering machine will record messages.

BUILDING AND CIVIL ENGINEERING TRANSLATIONS from Russian and German into English. G. L. Cairns, MIL, 19 Kingsley Place, London N6. Tel. 01-340 8990.

TECHNICAL SWEDISH, DANISH, NORWEGIAN translated by J. T. Craddock, B COM, FIL, Ekard, Ray Park Avenue, Maidenhead, Berks. Maidenhead 24931.

JAPANESE/ENGLISH, RUSSIAN/ENGLISH translations. Chemistry, medicine, biology, zoology. D. A. Fraser, BA, MIL, 22 Gresley Road, London N19 3JZ. Tel. 01-272 5664.

WILFRED E. GOODAY, ARSM, DIC, C.ENG, MIMM, FIL. Member of Translators' Guild, Romanian and French. 161 Rivermead Court, London SW6. RENown 1912.

RUSSIAN/ENGLISH TECHNICAL TRANSLATIONS. Chemical, metallurgical and related subjects. D. E. Hayler, 86 Manton Drive, Luton, LU2 7DL. Tel. Luton 25238.

SCIENTIFIC TRANSLATIONS FROM JAPANESE, CHINESE, RUSSIAN, CZECH and other East and West European languages into English and/or German. A. K. Henn, B SC, 'Glenside', Lower Leigh Rd., Pontnewynydd, Pontypool, Mon. Tel. Pontypool 3689 (after 6 p.m.).

MEDICAL, PHARMACEUTICAL, BIOLOGICAL translations from French, Romanian and Portuguese into English and from English into French and Romanian. Dr J. Jacobson, 94 Temple Fortune Lane, NW11. 10-455 1010.

TECHNICAL TRANSLATIONS from Russian, German and Polish into English, B. Klipstein, BSC(HONS), 1 Glenview Grove, Shipley, Yorkshire. Tel. Shipley 58215.

TECHNICAL AND COMMERCIAL translations from English into Russian. Mrs O. Linsley, 31 Parke Road, Barnes, London SW13. Tel. 01-748 8822.

TECHNICAL TRANSLATIONS from Japanese into English. R. A. Scutt, BA, 48 Somerset Avenue, West Wimbledon, London SW20. Tel. WIMbledon 1713 (01-946 1713).

TECHNICAL OR COMMERCIAL translations into/from English, German, Dutch and French. A. M. H. Speller, FIL, NGV, 6 Lakeside, West Ealing, London W13 8HN. Tel. 01-998 1045.

AUTHORITATIVE TECHNICAL TRANSLATIONS. Spanish, French, Italian, German, Portuguese, camera copy or printed. E. W. Sykes, FIL, 39 West Close, Wembley, Middlesex, HA9 9PJ. Tel. 01-904 4273.

Advisory services

IRAS: A NEW ADVISORY SERVICE. As much or as little advice and assistance as you need—anything from a half-day's talk to a six-months' assignment. Miss Helen Townley, I.R. Advisory Services, 117 Wickham Chase, West Wickham, Kent, BR4 0BQ. 01-777 7560.

For Sale

DOCUMENTATION OF MOLECULAR SPECTROSCOPY (DMS). Offers are invited for Vols. 1-11 (1957–67), English Edition. Approx. 19,000 cards, having edge-notched and optical coincidence search facilities, in metal cabinets, together with literature lists. Useful back run for new subscribers to this documentation service. Full details available from the Librarian, University of Bradford, Yorkshire, BD7 1DP.

SUBSCRIBERS TO *CHEMICAL ABSTRACTS* requiring only the even numbered issues (Inorganic Chemistry) would like to contact anyone interested in acquiring the alternate issues (Bio-Chemistry and Organic Chemistry) with a view to sharing the annual subscription. Offers to Librarian, Magnesium Elektron Limited, P.O. Box 6, Clifton Junction, Manchester M27 2LS. Tel. 061-794 2511.

Appointment wanted

BUILT ENVIRONMENT, INFORMATION SCIENCE, EDUCATIONAL TECHNOLOGY. As a professionally qualified and extensively experienced academic information officer I seek a new, innovative, rewarding and responsible senior post where two or all of the above fields overlap. Specialising in information flow, 'gatekeeping' and multi-media dissemination work in higher education for the built-environment and design professions I will consider offers for similar or related work from the professions, industry, publishing, research or teaching etc. Write initially to Michael Munday, MSc., Dip.Arch., M.I.Inf.Sc., A.R.I.B.A., 56 Dunmowe Way, Fulbourn, Cambridge.

G. D. Searle & Co. Ltd.

Medical Information Scientist

£1,700+

We are looking for a graduate to set up a new medical literature information system to service scientific committees and provide information for our medical department, to index documents and carry out literature searches.

Experience in medical information work is essential as is a degree in a related subject, e.g. Pharmacology or Physiology. Some knowledge of computers in connection with information storage would be an advantage.

Company benefits are above average and this position will be based at our new modern headquarters at High Wycombe.

Please apply to:

The Personnel Manager,
G. D. Searle & Co. Ltd.,
Lane End Road,
High Wycombe,
Bucks.

Telephone: High Wycombe 21124

SEARLE

Research in the Service of Mankind

British Technology Index

CURRENT SUBJECT GUIDE TO BRITISH TECHNICAL JOURNALS

FOR TRACING AND RECALL

of $\left\{ \begin{array}{l} \text{specific} \\ \text{recent} \end{array} \right\}$ information

In the Field of Applied Science, Engineering and Manufacturing Technology

Monthly Parts and Annual Volume

THE LIBRARY ASSOCIATION

7 Ridgmount St. Store St. London, WC1 7AE
(Phone: 01-636 7543)

Assistant Librarian

The Central Research Laboratories of the GEC have a large technical library with about 30,000 volumes and a staff of 8.

We are now looking for a partly qualified Librarian with at least 2 years' general experience, preferably technical, and should include cataloguing and classification (UDC).

Qualifications could be 'A' levels or Part I A.L.A. and part-time study for further qualifications will be encouraged.

Please apply giving brief details to: **The Staff Manager, Ref. L/535, The General Electric Company Limited, Hirst Research Centre, Wembley, Middx. HA9 7PP.**

G.E.C.

HIRST RESEARCH
Wembley

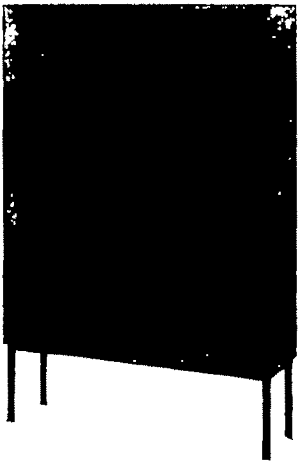
STOCK ADULT FICTION

Our new catalogue took months to prepare, and we hope it meets your requirements. The books are reinforced by sewing through the original publishers' cases, so adding greater strength to case and sewing. Then the original publishers' jackets are inserted in plastic sleeves.

If eventually this binding should break down then of course you can always send it to us for re-binding.

CEDRIC CHIVERS LTD
PORTWAY
BATH BA1 3NF **Tel. BATH 23201/3**

LIBRARY FURNITURE



No. 127. PERIODICAL DISPLAY AND STORAGE RACK 6 ft. high by 4 ft. wide having lift-up shelves with storage space behind.

Catalogue of full range of Library Furniture available on request.

B. Serota Ltd.

Contractors to H.M. Government and Municipal Authorities
Acme Works, Rendlesham Road, Clapton, London, E5 8PS
Tel. 01-985 1736/1787

First for carpets
Dodson Bull

UP TO **30% DISCOUNT**
BRANDED CARPETS

Wilton ● Axminster ● Oriental ● Tufted ● All makes available with full Manufacturers' Guarantees ● NO IMPERFECT GOODS SOLD ● Free delivery in U.K. ● Expert fitting service available most areas.

£200,000 carpets on display
in our extensive London and provincial showrooms
Write stating requirements or for Introduction to carpet showrooms in most main cities. Free brochure on request to Dept. ALB

DODSON BULL CARPET CO. LTD
LONDON: 5 & 6, Old Bailey, EC4M 7JD. Tel: 01-248 7971. **BIRMINGHAM:** 164, Edmund St., B3 2HB. Tel: (021)236 5862. **BOURNEMOUTH:** 268, Old Christchurch Rd., BH1 1PH. Tel: 21248. **BRISTOL:** 2-3, Royal London House, Queen Charlotte St., BS1 4EX. Tel: 28857. **LEEDS:** 12, Great George St., LS1 3DW Tel: 41451. **MANCHESTER:** 55-61, Lever St., M1 1DE. Tel: (061) 236 3687/8/9. **NEWCASTLE-upon-TYNE:** 90-92, Pilgrim St., NE1 6SG. Tel: 20321/21428. **WESTCLIFF-on-SEA:** 495, London Rd., SS0 9LG. Tel: Southend 46569.
Open: 9.00-5.30 Mon-Fri. Sat. 9.00-12.00
(Manchester 9.00-4.00)

UNIVERSITY MICROFILMS LIMITED

We show some of our titles in the field of science

3rd INTERNATIONAL CONGRESS OF SURFACE ACTIVITY. COLOGNE 1960. 4 VOLS.
J. W COOK. PROGRESS IN ORGANIC CHEMISTRY. 4 VOLS.
FAZLUL ALAM. CYBERNETICS.
W. E. GARNER (Ed) CHEMISTRY OF THE SOLID STATE.
P. GRODZINSKI. DIAMOND TECHNOLOGY. 2nd ed., rev. & enl. 2 pts.
W. C. JOHNSON. ORGANIC REAGENTS FOR METALS & OTHER REAGENT MONOGRAPHS.

WE HAVE MANY OTHERS

Available on microfilm or as xerographic facsimiles.

Details from:

UNIVERSITY MICROFILMS LTD.
A XEROX COMPANY
TYLERS GREEN, HIGH WYCOMBE,
BUCKS
TELEPH 049-481 3844 TELEX 83536

We have now taken over the following remaining stock of

'THE ENGLISH CATALOGUE OF BOOKS'

Volume 16, 1948–1951,	Cumulative Volume £18.75 ($56.50)
Volume 17, 1952–1955,	Cumulative Volume £16.00 ($45.75)
Volume 18, 1956–1959,	Cumulative Volume £20.00 ($57.20)
Volume 19, 1960–1962,	Cumulative Volume £21.00 ($60.00)
Volume 20, 1963–1965,	Cumulative Volume £25 00 ($71.50)
1966, Annual Volume	£6 50 ($18.60)
1967, Annual Volume	£7.00 ($20.00)

Limited quantities available—early ordering essential

ALSO ALL CUMULATIVE AND MOST SINGLE YEARLY VOLUMES, NEW AND SECONDHAND, FROM 1801–1969. FULL DETAILS ON REQUEST

THE BRITISH MUSEUM SUBJECT INDEX By G. K. Fortescue

1881–1900 Three Volumes	£10 50 ($30.00) per volume
1901–1905 One Volume	£12.60 ($36.00) per volume
1906–1910 One Volume	
1911–1915 One Volume	
1916–1920 One Volume	
1921–1925 One Volume	
1926–1930 One Volume	
1931–1935 Two Volumes	
1936–1940 Two Volumes	
1941–1945 One Volume	£10.00 ($30.00)
1946–1950 Four Volumes	£24.00 ($67.50)
1951–1955 In preparation	
1956–1960 Six Volumes	£60 00 ($175.00)

SUBJECT INDEX OF BOOKS RELATING TO THE EUROPEAN WAR ACQUIRED BY THE BRITISH MUSEUM 1914–1920 £3.15 ($9.00)

A SUBJECT INDEX OF BOOKS PUBLISHED UP TO AND INCLUDING 1880 By R. A. Peddie

Complete set of 4 volumes £78.75 ($225.00) Single volumes £21.00 ($63.00)

PALMER'S INDEX TO 'THE TIMES' NEWSPAPER 1790–1941 (June)

Complete microfilm edition in 21 reels which can be supplied individually: £282.50 ($795.00). Also available are some of the original bound quarterly volumes within the period 1867–1941. Details on request.

The following titles always available. Details on request.

Whitaker's Cumulative Booklist—both cumulative and yearly volumes; Reference Catalogue of Current Literature; Cumulative Book Index; Book Prices Current; The Illustrated London News; Picture Post; The Times; Palmer's Index to The Times, original quarterly volumes as well as Palmer's Index to The Times 1790–1941 (June) on Microfilm; The Official Index to The Times, orig. vols ; The Annual Register; The Quarterly Review; The Economist; The Times Literary Supplement; Chemical Abstracts; Studio; Parliamentary Debates—Lords and/or Commons, all series, etc. Some books on Librarianship—list available. As well as periodicals in all fields and languages.

Further interesting titles

BIBLIOGRAPHERS MANUAL OF ENGLISH LITERATURE by William Thomas Lowndes, revised and enlarged edition by Henry G. Bohn, 8 volumes complete. 3403 pp. 50,000 entries £75.00 ($225.00)

THE COINAGE OF ENGLAND by Charles Oman, K.B.E. Originally published in 1931 this detailed work on the national coinage of England is constantly sought after and now as topical as ever. 45 plates. Indexed, 395 pp. £9.45 ($27.00)

THE SHAKESPEARIAN DICTIONARY by Thomas Dolby. A most outstanding publication, of considerable interest to both the scholar and student of Shakespeare. 367 pp. Size 7¼"×4¼". Fully bound Frontispiece £5.25 ($15.00)

BIBLIOGRAPHY OF THE WRITINGS OF ALFRED, LORD TENNYSON edited by J. C. Thomson. This important bibliography, first published in 1905 and since considerably sought after, has now been reprinted £4.20 ($12.00)

INTERNATIONALE BIBLIOGRAPHIE DES ZOLLWESENS + 1st SUPPLEMENT by Dr. Hermann Martinstetter £7.35 ($21.00)

BIBLIOGRAPHY OF COCOA by Wolf Mueller £6.30 ($18 00)

ENGLISH INDUSTRIES OF THE MIDDLE AGES by L. F. Salzman . £6.30 ($18.00)

ENGLISH TRADE IN THE MIDDLE AGES by L. F. Salzman £9.45 ($27.00)

THE AUSTRALIAN CATALOGUE edited by A. B. Foxcroft . . £9.45 ($27.00)

THE CANADIAN CATALOGUE OF BOOKS 1791–1897 by W. R. Haight £9.45 ($27.00)

THE ENGLISH NAVAL FORCES 1199–1272 by F. W. Brooks £5.25 ($15.00)

CODICUM NOVI TESTAMENTI—SPECIMINIA: PAGINAS 51 EX CODICUBUS MANUSCRIPTUS ET 3 EX LIBRIS IMPRESSIS COLLEGIT AC PHOTOTYPIC RETRAESENTATAS edited by Henr. Jos. Vovels £12.60 ($36.00)

THE GERMAN AIR RAIDS ON GREAT BRITAIN 1914–1918 by Captain Joseph Morris, Illustrated £9.45 ($27.00)

H. PORDES

PUBLISHER & BOOKSELLER 529b Finchley Road, London N.W.3, England. Tel: 01-435 9879/9

24 JUN 1972

A Manual of Cataloguing Practice

K.G.B. Bakewell

A comprehensive guide to cataloguing, combining theory and practice, with particular reference throughout the text to the practices of thirteen representative examples of different kinds of libraries whose cataloguing departments were visited by the author.

300 pages £8.00 hard cover

International Organization Documents for Translation from French

J. Coveney

Contains extracts chosen from documents published in French by a number of international organizations and is designed to provide material for practice in 'documentary' translation.

100 pages £2.25 hard cover £1.40 flexi cover

Trilingual Dictionary for Materials and Structures

J.E. Holmstrom, M. Fickelson, D. Jejčič

This dictionary, whose terms and definitions have been suggested by British, American, French and German experts, gives the equivalents in English, German and French of technical terms relating to many aspects of engineering design and construction.

984 pages £12.00 hard cover

International Conference on Structural Safety and Reliability

A.M. Freudenthal

Contains papers presented on various aspects of structural safety and reliability at the Smithsonian Institution, Museum of History and Technology, Washington.

Partial Contents: *General Aspects of Structural Reliability.* Methods of Safety and Reliability Analysis—M. Shinozuka; *The Statistical Theory of Extremes.* Extreme Value Theory and Stochastic Processes—M.R. Leadbetter; *Random Excitation of Structures.* Structural Safety and Reliability under Wind Action—A.G. Davenport; *Aircraft Structure.* Reliability Analysis in the Estimation of Transport-type Aircraft Fatigue Performance—J.B. Butler; *Special Reliability Problems.* Safety and Reliability of Nuclear Reactors—Th. Jaeger.

364 pages £15.00 hard cover

Advances in Machine Tool Design and Research

11th International Conference—Volumes 1 and 2

Edited by S.A. Tobias and F. Koenigsberger

These proceedings contain experimental and theoretical work, as well as work of a technical nature on designing and manufacturing problems that are original and of potential value to every sector of the Machine Tool Industry.

Contents: *Volume 1*; Opening Address; Machine Tool Dynamics; Machine Tool Design: Automation; Metal Cutting and Grinding. *Volume 2*: Opening Address; High Energy Rate Forming; Metal Forming.

Volume 1: 784 pages. Volume 2: 544 pages
£37.00 hard cover set of two volumes

Pergamon

Published in England by Aslib, 3 Belgrave Square, London SW1X 8PL
Printed by Alden & Mowbray Ltd at the Alden Press, Oxford

CAL
UNIVERS

Aslib Proceedings

incorporating Aslib Information

Librarians and the management of library systems P. A. THOMAS and VALERIE A. WARD 229

The foreign language and translation problems of the social sciences W. L. SAUNDERS 233

Patents as a source of technical information K. M. SAUNDERSON 244

ASLIB · 3 BELGRAVE SQUARE · LONDON SW1

Aslib Proc. vol. 24 no. 4 pp. 215-262 London, April 1972

Claude Gill Books

a five star service to management

★ **Management and Training Centre**
A unique centre displaying over 10,000 titles on all aspects of management. Managers will find its comprehensive coverage meets all their needs.

★ **Mail Order Supply**
An efficient mail order section supplying books by post to customers throughout the world. Expert staff quickly trace current or out-of-print works, whatever the source.

★ **Worldwide Journal Subscriptions**
You can place a subscription with Claude Gill Subscriptions Ltd. for any journal, in any language, published anywhere in the world. Free renewal reminder service avoids interruption of supply.

H.M.S.O. ★ **Publications**
Government reports, bulletins and other publications available direct to visitors or mail order customers from a government publications department located within the Claude Gill showrooms.

'New Books' ★ **Bulletins**
Regular customers receive the monthly Claude Gill 'Management Newsletter' or 'Science Bulletin'. Listing and describing the most important new books and journals as they appear, these bulletins enable customers to keep up-to-date with latest developments.

Simply write to us if you would like to receive these bulletins for a 3 month trial period.

Claude Gill Books

Management & Training Centre, 481 Oxford St., London W1R 2AQ

CAL
UNIVERS

Aslib Proceedings

incorporating Aslib Information

VOLUME 24 APRIL 1972 NUMBER 4

© 1972 Aslib and contributors

Aslib Proceedings: incorporating Aslib Information *is published monthly and supplied free to members of Aslib. Subscription rates are £10 annually to non-members, or £2.50 to Aslib members requiring additional copies. Single copies £1, or 25p to members.*

Further information about Aslib's services and membership rates will be supplied on application to the Director, Aslib, 3 Belgrave Square, London SW1X 8PL. Tel. 01-235 5050. Telex 23667; answer-back, Aslib London.

ASLIB CALENDAR 1972

May

WED.3.	Computer Information Group evening meeting. Aslib. 5 for 5.30 p.m.
THU.4.–SAT.6.	Northern/Midlands Branch joint conference: 'Services to the information unit.' Derwentwater Hotel, Portinscale, Keswick.
WED.10.	Aslib evening meeting: 'Measures as management tools' by Richard Orr (Director, Institute for Advancement of Medical Communication, USA). Royal Institution of Naval Architects, 10 Upper Belgrave St, SW1.
	Midlands Branch Forum: 'Trade literature'. British Rail Research Department Library, Derby.
MON.15.	Co-ordinate Indexing Group meeting. Aslib. 3.30 p.m.
TUE.16.	Midlands Branch visit to *Birmingham Post and Mail* offices.
	Economic and Business Information Group Annual General Meeting and lunch. St Ermin's Hotel, Caxton St, SW1.
MON.22.	Social Sciences Group evening meeting. Aslib. 5 for 5.30 p.m.

June

TUE.6.	Aslib R & D Dept. evening meeting. Aslib. 5 for 5.30 p.m.
	Biological Group AGM and lecture: 'Biological Abstracts Preview Project' by Miss M. Williams (Experimental Information Unit, Oxford). British Museum (Natural History), SW7. 2.15 p.m.
WED.14.	Aslib Annual General Meeting.
	Sixth Aslib Annual Lecture: Dr B. J. Mason, FRS (Director-General, Meteorological Office) on 'The World Weather Watch: a global system for the collection, communication and processing of weather information'. Royal Aeronautical Society, 4 Hamilton Place, W1.
FRI.16–SUN.18.	Electronics Group 14th annual conference. Civil Service Staff College, Ascot.

MON.19.	Co-ordinate Indexing Group meeting. Aslib. 3.30 p.m.
WED.21	Aslib one-day symposium: 'Tomorrow's information worker—education and training.' Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1.

July

THUR.6.	Symposium (with BSI) on UDC. Royal Aeronautical Society, Hamilton Place, W.1 2.15 p.m.
FRI.14.–SUN.16	Computer Information Group Conference, University of York.

September

SUN.24.–WED.27.	Aslib 46th Annual Conference, Ranmoor House, University of Sheffield.

October

WED.18.	Aslib evening meeting: 'Electronic intelligent machines', by Dr Igor Alexsander (University of Kent). Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1.

November

TUE.21.	Aslib one-day study conference: 'Management in a service context.' 36 George Street, Manchester.

ASLIB INFORMATION

New Members

CORPORATE

(*specialized Group interests are given after names, where relevant*)

Name	*Location*	*Representative*
Combined Optical Industries (*AVG*)	Slough	M. Sigmund
Progressive Research Services (*Chem, Eng*)	Solihull	D. Oliver
Software Sciences	London	C. Barnes
Sturge, J. E. & Co. (*Bio, Chem, Eltron*)	Birmingham	D. Ross
British Nuclear Fuels	Capenhurst	G. E. Lowe
Christian Salvesen (Managers) Ltd (*Bio, CIG*)	Edinburgh	D. King
Lippiatt, Hobbs Ltd	Rickmansworth	H. Hobbs
Pye Unicam (*Chem, CIG, Eltron, Eng*)	Cambridge	Mrs H. Topliss
Ranco Controls	Plymouth	E. Molyneux
Institute of Municipal Treasurers and Accountants (*EBIG, SSG, Trans*)	London	A. Legg
Avery Hill College of Education (*AVG, Bio, Chem, EBIG, Eng, SSG*)	London	Miss J. Wood
British Bureau of Television Advertising (*AVG, CIG, SSG*)	London	Miss A. Mayer
GLC—Planning and Transport Dept. (*AVG, CIG, EBIG, Eng, SSG, Trans*)	London	D. Kennington
National Environment Research Council—Unit of Coastal Sedimentation	Taunton	Mrs C. Whiteway
Perth Technical College (*AVG, Eng*)	Perth	Miss J. Bullock
Royal Commission on Historical Manuscripts (*SSG*)	London	R. Storey
Royal College of Art (*AVG, Eltron, Eng, Trans*)	London	H. Brill
Tamworth Public Library	Tamworth	V. Tyrrell
Worcester Technical College (*AVG, CIG, Eng*)	Worcester	Mrs H. Jones
Société Nationale de Sidérurgie (*AVG, CIG, EBIG, Eng, SSG, TTG*)	Algiers	O. Grine
Anglo American Corpn.	Johannesburg	Mrs S. Loseby
Fundação Centro Nacional de Segurança, Higiene e Medicina do Trabalho	São Paolo, Brazil	M. Gaya
Environment Canada (*Bio, CIG, EBIG, TTG*)	Ottawa	Miss E. A. Keeley
ANVAR (*Chem, Econ, Eltron*)	Paris	de Monjou
TEBROC	Tehran, Iran	M. Taffazzoli
NATO Research Centre	La Spezia, Italy	J. Bethell
Koninklijke Instituut voor de Tropen	Amsterdam	Dr van der Wal
P.A. Tiele Academie	The Hague	H. Sleurink
University of Natal	Pietermaritzburg, S. Africa	Miss S. Hindle
Gesellschaft für Mathematik und Datenverarbeitung mbH (*Comp. App., CIG, Comp/DP*)	Birlinghoven	M. Fischer
Centro Studi e Laboratori Telecommunicazioni	Rome	O. Porello

INDIVIDUALS

R. N. Oddy (*Comp. App.*)
D. Scarfe (*SSG*)
Miss D. R. Barr (*Comp./DP*)
H. Hague
Miss Jean Blue (*Comp./DP*)
O. Blunn (*TTG*)
A. C. Foskett (*Comp. App.*)
Mrs M. Flower
Miss M. J. MacPhail (*SSG*)
L. Stevens-Wilson (*Comp. App., CIG, EBIG*)
E. Whittle

Sixth Aslib Annual Lecture

Aslib's sixth Annual Lecturer will be Dr B. J. Mason, FRS, who is Director General of the United Kingdom Meteorological Office and formerly Professor of Cloud Physics at Imperial College, University of London.

The research on which Dr Mason has built his distinguished career has been mainly concerned with the physical processes involved in the formation of clouds, rain, snow and lightning, subjects on which he has published a major monograph as well as a more popular text, *Clouds, Rain and Rain-making* (Cambridge University Press, 1962). He was a Warren Research Fellow of the Royal Society in 1957, Visiting Professor of Meteorology at the University of California 1959–1960, President of the Royal Meteorological Society from 1969–1970 and Honorary General Secretary of the British Association for the Advancement of Science from 1965–1970. He is at present Permanent Representative of the United Kingdom at the World Meteorological Organization and a Member of its Executive Committee.

The title of his Lecture, appropriately for so dedicated a weather man, is 'World Weather Watch', which he explains as 'a global operational system of improved meteorological observations, communications, and data processing facilities aimed at enhancing our understanding of the behaviour of the global atmosphere and at producing weather forecasts of greater reliability and range'. The design, implementation and operation of the system will be described with particular reference to the use of satellites and giant computers in the collection, exchange and processing of the data; and recent developments in the production of numerical weather forecasts will be reviewed. Such a theme lends itself to visual presentation and film and demonstration material will illuminate Dr Mason's already exciting and world-wide ranging account.

The Lecture will be delivered in the Lecture Theatre of the Royal Aeronautical Society, 4 Hamilton Place, London W1, at 6 p.m. on Wednesday, 14th June 1972. Further information and tickets of admission can be obtained on application to: The Meetings Organizer, Aslib, 3 Belgrave Square, London SW1X 8PL.

Tomorrow's information worker: education and training

Rapid development in the library and information profession, coupled with the general upgrading of education throughout the country, has created problems in the education and training of entrants to the profession. These problems will be explored at a Symposium planned by Aslib, to be held in the Weir Hall of the Royal Institution of Naval Architects, 10 Upper Belgrave Street, London SW1, on Wednesday, 21st June 1972.

Up to the early postwar years, the library and information profession was mainly recruited from good calibre grammar school leavers with a number of 'A' levels. More and more such young people nowadays go on to University and it is from graduates that the profession's main intake now comes. This of course has in its turn effected the entrance qualifications now required.

The graduate and postgraduate courses that are rapidly becoming the norm for the whole profession are being questioned on two fronts. They are structured on the whole to produce the top managers in the field but do not cater so well for those to whom will fall the essential routine duties of a library or information unit. What sort of training do these people need and what should their career structure be? At the same time, the content of library and information work is being dramatically altered, particularly by mechanization and the management techniques that come in its trail. Jobs in future will be different from those in the past and it is questionable whether the present form of library education is yet geared to produce people expert in these techniques and able to mesh them into the general pattern of the profession.

For further details, and a programme with form of application, contact the Conference Organizer, Aslib, 3 Belgrave Square, London SW1X 8PL.

Measures as management tools

A Senior Visiting Research Scientist at Aslib will be the speaker at the Aslib evening meeting on 10th May. He is Dr Richard H. Orr, Director of the Institute for Advancement of Medical Communication, Philadelphia, USA, who will discuss measures as management tools.

Regardless of his position, the practising librarian has two central problems that are managerial in nature—how to obtain from higher levels of management the resources (funds, personnel, space, etc.) necessary to meet his responsibilities, and how to employ the resources so obtained to maximal advantage. The best librarians have long made some use of quantitative measures as tools, or aids, in solving these problems; but now, from both within and without the profession, there are increasing pressures for routine use of such tools to guide and justify decisions at all managerial levels. These pressures are generating needs for more practical methods of collecting the traditional kinds of data on library operations, and for new types of measures that relate more directly to the benefits of library services. Progress in developing and using these management tools in the UK and USA will be reviewed and illustrated with examples.

Chairman of the meeting will be Mr A. Graham Mackenzie, MA, ALA, Librarian and Director of the Library Research Unit at the University of Lancaster. The meeting will be held at the Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1, and will begin at 5.30 p.m. (tea at 5 p.m.).

Introductory course on informatics/documentation

The FID has recently published *Introductory course on informatics/documentation* by A. J. Mikhailov and R. S. Giljarevskij. This is a revised and enlarged edition of an earlier manuscript circulated by Unesco in 1970.

The work contains the texts for a series of lectures (see chapters listed below), questions for self-checking, lists of references, forty illustrations and a course outline.

The chapters of this publication are: 1. Scientific information activities—organic part of scientific work; 2. Scientific literature—source and means of dissemination of knowledge; 3. Information and bibliographic publications—sources of data on literature; 4. Information agencies and special libraries—auxiliary institutions of science; 5. Essentials of information retrieval; 6. Conventional information retrieval systems; 7. Descriptor information retrieval systems; 8. Technical facilities of information retrieval; 9. Reproduction of scientific documents; 10. Use of scientific information.

It is available from FID (7 Hofweg, The Hague, Holland) price 35 Dutch guilders.

Collaboration on research projects from Ealing School of Librarianship

Number blindness is a common enough phenomenon but little is known about why it exists and how it affects career prospects of young people. The School of Librarianship at Ealing Technical College is assisting in research on this problem, in collaboration with Professor G. Russell of the Department of Psychological Medicine at London's Royal Free Hospital. As a start, students and staff are completing a very detailed questionnaire, to be followed up probably by controlled tests.

The Ealing School is also collaborating with Lancaster University. One long-term research project is an attempt to get a much better understanding of the complex interrelationships between libraries and their users. One of many problem areas in this study of user dynamics is the efficient exploitation of academic library resources. In support of Lancaster University, Ealing is running a pilot survey, designed by lecturers L. C. Guy and C. T. Thorne, on librarianship students to discover the actual usage pattern of books throughout periods of loan. Ultimately, the project will take in the whole student population.

Recognizing the importance of management teaching, Lancaster University has completed a one-year feasibility study on computer-controlled management games, based on mathematical models of library provision. Acting as consultant throughout this project was Mr L. C. Guy, Senior Lecturer in Librarianship at Ealing Technical College. These computer-controlled teaching packages were demonstrated recently before a small group of librarians and information officers selected from different establishments within the UK.

Institute on International and Comparative Librarianship

A two-week Institute on International and Comparative Librarianship and Information Science is being held by the University of Maryland's School of Library and Information Services, from 31st July to 11th August 1972.

Among the topics to be discussed are the following: the role and contribution of international bodies, i.e. FID, IFLA, OECD and Unesco; UNISIST—history, rationale, prognosis; foreign, regional and national information and library structures; the developing nations—problems and issues; and trends of international technical practices.

Inquiries about further details and application material should be addressed to: Mrs E. Knight, International Institute, School of Library and Information Services, University of Maryland, College Park, Maryland 20742, USA.

ASCATOPICS

The Institute for Scientific Information has recently begun a new information-alerting service that provides subscribers with weekly bibliographies of the journal literature published on nearly one hundred scientific and technical subjects with high research priorities. Most of the subjects covered are in the areas of environmental science, medicine, biology, and chemistry, with emphasis on the adverse effects of pollutants, food additives, pesticides, and drugs.

Called ASCATOPICS, the new service monitors the output of 2,500 major scientific and technical journals in the world, and articles are usually listed in the bibliographies within three weeks after their publication in a journal.

The cost of ASCATOPICS varies, but most subjects can be covered for $95 a year for fifty-two bibliographies. The UK representative of ISI, from whom further details can be obtained, is Mr A. E. Cawkell, at ISI, 132 High Street, Uxbridge, Middlesex.

Chemical Insight

The first issue of a new fortnightly commentary on the international chemical industry has recently been published by Mr Michael Hyde, formerly editor from 1958 to 1971 of the international news journal, *Chemical Age*.

Called *Chemical Insight*, the commentary will be directed at decision-makers in financial, economic, governmental and engineering circles to enable them to make their decisions on a better understanding of the industry and its problems. *Chemical Insight* will also discuss the attitudes of the financial world towards the industry and seek the reasons behind vital government decisions.

It will be sold on a subscription basis at £75 a year. Orders and further enquiries should be sent to: Chemical Insight, 44 The Keep, London SE3 0AF.

Archives of British Men of Science

In 1969 a study group at Sussex University, under the direction of Dr Roy Macleod, with support from the Social Science Research Council and the Royal Society, set out to locate the basic documentation of some 3,400 men and women working in the field of science. The result of the first stage of this survey of the bibliographical and conceptual history of science has recently appeared in microform as *Archives of British Men of Science*, published by Mansell Information/Publishing Ltd. In many cases the contributions made by these people to the history of their subjects were in the fields of teaching, administration or industrial application rather than in the pursuit of new knowledge.

The approximately 4,000 foolscap pages of data collected in the search are contained in fifty-nine microfiches, each fiche containing, on the average, information on sixty people. The whole work is indexed in an accompanying booklet.

The fiches (148 × 105 mm) are supplied in negative form, price £20. For further information contact Mansell Information Publishing Ltd, 3 Bloomsbury Place, London WC1A 2QA.

The FID policy for the UDC

Mr J. E. Wright, Librarian of the Institution of Electrical Engineers and Chairman of the BSI Committee OC/20/4 for UDC, writes:

The FID has undertaken as a matter of urgency to prepare a scheme which may drastically alter the tables of the UDC. Although the full proposals have not yet been decided, the information that is available indicates that they will significantly affect existing users.

For this reason the British National Committee for the UDC, Subcommittee OC/20/4 of the British Standards Institution, is anxious that as many English-speaking users as possible of UDC and BS1000 should be fully aware of the position.

Apparently FID is anxious that UDC should be adopted by UNISIST as an international 'switching' language for linking various classification systems and thesauri. UNISIST is a proposed world science information system suggested in a Unesco/ICSU report.

Whether UNISIST can be made to function remains to be seen. Such a concept, however desirable, cannot quickly be brought into being and will depend on a very great deal of co-operation from many countries. As to the need to revise drastically the tables of the UDC to make it acceptable as a 'roof classification' some experts consider this necessary, others do not.

In the opinion of the British National Committee, what is of more importance is the effect of such changes on existing UDC users, and on the English edition, published as BS1000, in particular. The UDC has been criticized often and for a variety of reasons, but in spite of all its imperfections it is widely used and continuously finds new users.

Complaints are made that its hierarchical structure leaves much to be desired, that new concepts cannot be introduced in their logical places, and that some broad concepts can only be introduced by using as many digits as are used in other parts of the tables for very detailed classification. These criticisms may be justified, but they can be overcome by using the alphabetical subject key—the index, which the English edition provides and which ought to be an integral part of an edition in any language.

Of much more importance has been the complaint that the tables are not sufficiently up to date to permit the classification of new developments in science and technology, and that there is no complete English edition. To meet these criticisms the British National Committee and its many specialist panels have been pushing ahead, as a priority since 1965, with the publication of BS1000, and this work is very nearly completed. Unfortunately many parts of the tables are only translations of the last complete foreign language edition, together with subsequently authorized extensions and modifications. However, with this done, it was hoped that the specialist panels would be able to proceed with proposals for improving the tables to meet present-day requirements.

The machinery for obtaining international agreement for new proposals and their central ratification has always been slow; too slow for some. This fault is inherent with any system involving international co-operation, particularly when voluntary committees are involved. Unfortunately the present signs are that this work may be delayed still further, or even set at nought, by the work on the proposed Standard Reference Code. The British National Committee has more than once in the past expressed its concern with the inadequacy of the FID Secretariat, which must implement the work of the many voluntary committees concerned with the revision of UDC. This kind of work the British National Committee knows to be very time-consuming and needs adequate funding.

It is disquieting, therefore, to note the sums which have been suggested for additional FID staff to process the work which will result from the proposals and at the same time to give adequate attention to the day to day revision procedure. This suggests that those responsible have no appreciation of just what is involved.

The British National Committee was also concerned to learn that some of its panels had expressed their grave concern that extensions and revisions to the tables on which they had been working were not being processed for publication as P-Notes. There was definite evidence of a slowing down of ordinary revision work, priority being given to work on more fundamental changes. The panels feel that in such circumstances there is no point in continuing their work on updating the tables for a new edition.

The general principle that has been borne in mind by panels of OC/20/4 when seeking to improve the UDC tables has been the need to modify, extend or cancel where necessary, but not to recast whole sections if less severe ways can be found. This is in order to cause minimum upset to the often extensive files that exist. The panels also try to resist any proposals involving duplication, such as developing a classification under a specialist heading when facilities already exist in the tables, remembering that applications for particular purposes can and should be indicated by use of the colon symbol. Occasionally more fundamental changes are necessary and have to be introduced, but this is different from the approach behind the changes which are now proposed.

It is often alleged that the tables of UDC contain long and detailed breakdowns which appear to have no usefulness today. This is true, but it may well be that some users, interested for example in the historical, may use the numbers that others wish to see deleted. By the same token, some proposals for extending the tables seem to be unnecessarily detailed, but if such detail is wanted it should presumably be available. Those who want less detailed tables may find their answers in the abridged edition of BS1000 or in a medium edition when it becomes available.

An outline of the drastic changes, in so far as they have been revealed, and of the subventions asked for to provide for additional staff, are given in the Appendix which follows. The documents circulated within FID and its associated national members and the published comments are too extensive for most readers to absorb readily, so this attempt has been made to state the position clearly and succinctly. A longer and most fair and able survey of the problem is given in a translation entitled 'Reorganisation of the UDC', a paper by Hans Wellisch which appeared in *Nachrichten für Dokumentation* (vol.22, no.2, April 1971, p.55–63) copies of which may be obtained from the Technical Information Department of BSI.

To summarize the situation, the British National Committee is not convinced that immediate drastic changes to the tables at top level (0–9, 00–99, 000–999) should be introduced, based on the ideas of a few bent on radical changes for reasons of pure ideology, but only as a result of a need for major changes discovered by those experts who are endeavouring to make the tables suitable for classifying modern concepts. The Committee is also concerned that the proposals of its panels for extensions and modifications to the tables, which they put forward, are unlikely to be dealt with speedily and may not be processed at all. This will hinder or prevent the appearance of revised sections of BS1000.

They have long felt that the FID Secretariat should be better organized and the limited staff and resources utilized for processing the revision proposals for the UDC that are submitted. The subventions asked for suggest that this need is still not properly understood. The British Standards Institution has already, through its representative in FID/CCC (the Central Classification Committee), and by letter, made known its concern at the changes which are intended. The Director of Aslib has written to the Secretary General of FID expressing misgivings, and a member of FID Council was briefed prior to a recent meeting of the Council at The Hague.

Obviously a system like the UDC, of which one of the advantages is its universality, must be governed by majority opinions when unanimity cannot be obtained. In an issue such as this it is important to ensure that all concerned understand the position and make known their views. Otherwise the views of a few enthusiasts, which may not accord with those of the majority, may prevail.

For this reason a half-day meeting, arranged by Aslib in co-operation with the BSI, is to be held on Thursday 6th July, 1972, at 2.15 p.m. at the Royal Aeronautical Society, Hamilton Place, London SW1. It is hoped that further details will be announced in the May issue of *Aslib Proceedings*. As many British users of UDC as possible are urged to attend. The views of overseas users of the English edition, BS1000, communicated when they cannot attend, will be equally welcomed.

APPENDIX (*by Mr D. Newcombe, Secretary of BSI Committee OC/20/4 for UDC*)

Summary of proposed basic structure and notation of SRC

Introduction. It is not yet certain whether the proposed Standard Reference Code (SRC) is intended to be a scheme with a *permanent* existence separate from UDC or one with only a *temporary* separate existence, with which the existing UDC will later be expected to merge.

Basic main classes. Instead of the present ten main classes (0/9) of UDC it is proposed that the SRC will have one hundred main classes (00/99) and that the decimal point, which divides UDC notation normally into mnemonically convenient groups of *three* figures, will initially appear only after the first group of *four figures*, to distinguish SRC notation from UDC notation, but thereafter as in UDC, i.e .with a 4–3–3 . . . pattern of figures instead of 3–3–3 . . . Further detail after the initial group of four figures *may* be provided either:

-by direct addition of the subdivisions of the existing (or revised) UDC, or
-by combination, through a suitably distinctive symbol, with the notation of some other system of classification or subject representation.

Choice and collocation of basic main classes. A decision will have to be taken first on those subjects to be basic main classes (00/99) and second on their order.

The following suggested relocations of some subjects within the existing UDC schedules may be taken into account:

Provisional locations proposed for 1972–73 revision programme		*Possible ultimate locations in UDC and/or SRC*	
38 (or 4 . . .)	Home and business management (from UDC 64/65)	38 (or 4 . . .)	
4 . . . ?	Medical science and technology (from UDC 61)	4 . . .	
4 . . . ?	Agriculture (from UDC 63)	4 . . .	
6	Technology and industry	6	
60	Engineering: conversion and exploitation of energy		
		62	Mechanical technology
603	Electrical technology (from UDC 621.3)	63	Electrical technology
604	Nuclear technology (from 621.039)	64	Nuclear technology

Funds approved by FID Council for elaboration of Standard Reference Code (SRC)

An initial allocation in 1971 of about £570 was made for the study of the feasibility of using UDC as a 'roof' classification by UNISIST. Before this had been completed, two further allocations were made, one of about £700 for the SRC, to elaborate the principles and the tables of main classes and common and special auxiliary subdivisions, and another of about £925 for UDC, for the radical revision of particular tables of common auxiliaries, e.g. of place, and of particular main classes, i.e. 0, 3, 5, 6 and for the elaboration proposals for the reoccupation of the now vacant class 4.

A total of about £2200 therefore indicates that heavy reliance is being placed on voluntary effort. A special FID/CCC Working Group is to meet four times a year, three days for each meeting, and international and national UDC committees are expected to give priority to proposals for SRC by putting forward ideal locations and revisions of the subject fields for which they are responsible. Nevertheless, assurance is given that the current level of effort devoted to conventional revision of UDC will be maintained.

BRIEF REVIEWS

MUENCH, EUGENE V. Biomedical subject headings: a comparative listing of National Library of Medicine (MeSH) and Library of Congress subject headings. Hamden (Conn.): Shoe String Press, 1971. 452 pp. $35.00. (ISBN 0 208 01225 7)

This work proposes to help life science libraries co-ordinate bibliographic information produced by the National Library of Medicine (NLM) with that emanating from the Library of Congress (LC) and convert from one system to the other.

The main body of the work comprises a comparative listing of the NLM's Medical Subject Headings (MeSH) and the LC subject headings. The list is determined by the alphabetical sequence of MeSH, but, the preface states, most LC headings follow the same sequence, as equivalents either of main headings or of cross-references in the MeSH list.

The second section consists of MeSH subheadings with their LC equivalents. This is intended to help users trace those compound terms which MeSH breaks into main headings and subheading in contrast to LC's use of a natural language, pre-coordinated heading (e.g. *NEOPLASMS–Nursing* in MeSH and *CANCER NURSING* in LC).

The third section comprises a list of LC headings, with MeSH equivalents, which do not fall into the alphabetical sequence of the first section. But the searcher for the MeSH equivalent of a composite natural language LC heading is advised also to look in the main section under both the natural language and the inverted form, as the latter is preferred by MeSH.

The concordance is presented by its compiler as one step towards a compatible network accommodating both MEDLARS and MARC.

PATRINOSTRO, FRANK, S. A survey of automated activities in the libraries of the United States. Tempe (Ariz.): LARC Association, 1971. 152 pp. $10.00. (A survey of automated activities in the libraries of the world, vol. 1.)

This, the first part of a twelve-volume series covering automation in the world's libraries, deals with experiences in the use of automated systems in American academic, public, state, federal and special libraries. Publication of the series is due for completion in November 1972.

The report starts with a statistical analysis of the survey returns and a brief commentary on trends in the various functional categories to which automation has been applied. There follow two detailed indexes of applications and of types of library. The main headings under which applications are arranged are: acquisitions, cataloguing, circulation, serials, management support, abstracting and indexing, bibliography and catalogues of special materials, dissemination, information retrieval, miscellaneous and, finally, special topics (e.g. government publications, control and/or listings, MARC).

The main body of the report comprises survey returns from 506 US libraries, information centres and library systems. The information provided on each project is: name and address of the operating organization, nature of the project, source of personnel, equipment used, name and status of the project co-ordinator and literature references.

SCONUL SLAVONIC AND EAST EUROPEAN GROUP. Directory of libraries and special collections on Eastern Europe and the USSR. Edited by Gregory Walker, in collaboration with T. H. Bowyer, P. A. Crowther and J. E. Wall. London: Crosby Lockwood, 1971. 159 pp. £2.50. (ISBN 0 258 96837 0)

Entries in this Directory give details of material held in libraries in the British Isles on any subject relating to, published in, or in a language of any country normally thought of as belonging to Eastern Europe, including East Germany and Greece (since 1821), but excluding Finland and Modern Turkey.

It is stated in the Introduction that archive and manuscript holdings are noted only where institutions have already been included on the strength of their printed book holdings. The entries were compiled from answers to a questionnaire circulated in June 1970 and information includes policy concerning use of the collections by the general public, lending facilities, services offered by the library and relevant publications issued by it.

There are two sections: the main section is arranged in alphabetical order of town or city and within each town in alphabetical order of name of the library. The second section lists names, addresses and telephone numbers of other sources of information such as embassies, trade and cultural organizations and specialist booksellers. There is a reasonably detailed index containing references to libraries, collections and subjects. Care and some imagination are needed, however, since only specific mention of special collections in a library's entry receives a separate reference: users not already aware of the existence of the School of Slavonic and East European Studies of the University of London, for example, will not find it listed under 'Russian language' or 'Russian literature', but under the more general heading of 'Russia'.

WHO OWNS WHOM (Continental edition). Vols 1 and 2: a directory of parent, associate and subsidiary companies, 1971/72. 11th edition. London: Roskill, 1972. Various paging. £10.50 *each vol.* £18.50 *the set.*

Over 100,000 parent, associate and subsidiary companies are listed in this directory which now includes information on companies based in Liechtenstein as well as other European countries; in addition there is a section showing United States parent companies and their continental Western European subsidiaries.

The information is arranged in two sections, under each country: section one shows the names of subsidiaries under the holding company, and section two lists the relationship under the name of the subsidiary. Addresses are not shown in full but the brief addresses given for the parent companies are said by the editors to be sufficient for a letter to reach the correct destination in most cases.

The editors check their information with parent companies: sometimes the parent will delete the name of a subsidiary from the list because they do not want the relationship known; however, the editors recheck and the name will be included in the directory if they can prove that the relationship does, in fact, exist. The information given was current at 15th October 1971.

Librarians and the management of library systems

P. A. Thomas and
Valerie A. Ward

Aslib Research & Development Department

SYSTEMS ANALYSIS is no new phenomenon, and the concept of hierarchies of systems is no novelty to a librarian. Its usefulness in classification schemes has long been appreciated. Control over change is one of the important contributions made possible by systems analysis. An organization and its environment are in a continuous state of change, and any information that can help people to understand, and hopefully to control, the way in which an organization reacts to change is of vital importance to management.

Organization theory has developed from the traditional or classical approach through the human relations or neo-classical, to the present emphasis on systems analysis. The classical approach was work-centred, and was obsessed with measurement and structure. The human relationists were more concerned with the individual and his behaviour as a member of a series of groups, both formal and informal. The systems approach offers a possible synthesis of what is good in the earlier theories, plus a number of developments of its own, such as its emphasis on the interactions between the component parts of a total system, information flows and communication networks.

Much of the literature on organization theory and systems analysis generally can be helpfully applied to the library situation. If the library itself is not a separate organization it can at least be usefully regarded as a sub-system of its parent organization. A knowledge of systems analysis, long-term planning and the management techniques that other members of management teams are finding useful, is of direct concern to the librarian as manager of his library. This is particularly so in the present economic climate when the fight for a share of the limited resources available has intensified.

Members of Aslib Research and Development Department have already spent some time in studying the applications of work study and organization and methods techniques to the operational activities of libraries. Having categorized and analysed the procedures of the operational sub-system, we wish to turn our attention to the administrative and managerial activities of librarians. There is not as much information available about these activities as there is about operational procedures like cataloguing and classification, and we felt that an exploratory investigation would be useful to discover just what administrative activities librarians are currently practising.

Fayol's description of managerial work as planning, organizing, co-ordinating and controlling has long been accepted, but it is rather vague. Categorization by 'traditional' functional area means less now that new approaches to analysing the structure of the total system are proving useful even in the industrial environment. In the library situation it would be even more difficult and confusing to attempt. Functional departments have not been developed on the more formal lines of division, contrasting production, sales and personnel. The range of functions dealt with by one manager-librarian is very wide, especially in the smaller library. We are trying to develop a more relevant categorization of work in the administrative sub-system of a library by looking at the day-to-day activities of a number of librarians in libraries of very different types. We want to see what similarities and what differences may emerge, and what problems confront librarians in managing their libraries, so that we can devise projects aimed at providing them with useful information. It is essential in a rapidly changing environment that the time and effort invested in allocating the available resources and in planning the future of the library should be made as effective as possible.

There are a number of problems involved in an investigation of library activities. Many librarians must cope with a certain amount of operational work, such as book selection, answering technical enquiries, or cataloguing. Our present interest is in the non-operational activities, the proportion of time spent in actually administering the library. The degree of managerial responsibility is often constrained by the structure and administration of the parent organization. Just how free is the librarian to manage his library? As it is the content of each action that we are interested in, and not just its occurrence, we have very large data collection and data analysis tasks, even with only a small sample of libraries. There is also, of course, the problem of methodology: just how should we collect the necessary information?

We decided to use self-administered diary forms for recording the activities of a number of librarians from different types of library. We interviewed each librarian at the start of the exercise, and asked him to tell us about his work. We also read any non-confidential formal documents available generally to members of the library staff, policy and procedure guides, staff instructions, and minutes of meetings. This helped to give us a background knowledge of each library, and to extend the time span of actions studied. In a data collection job there is a limit to the amount of time that can be covered, and this makes it especially difficult when dealing with the non-routine activities of senior staff.

As the libraries are of different types, they are likely to have various degrees of autonomy. We therefore asked each librarian to describe his library's relationship with the parent organization, and the organizational structure of the library itself. We also asked librarians to indicate their freedom in setting objectives, policy making and decision taking throughout their areas of activity, and for their definitions of these phrases. We showed them the diary forms, discussed their use, and left with them a pack of forms and short notes on their completion.

As this is primarily an exploratory project, and we are interested in the actual content of each activity, we are particularly anxious to avoid pre-defining what we are looking for, and so recording what we expect to find rather than what actually happens. We have developed a checklist of areas to be covered in the initial interview, but the emphasis is on what the individual librarians do and think, and we used the checklist (when needed at all) only to provide cues, and stressed throughout that it was their interpretations of their jobs that were important to us. The diary form itself (an edge-notched card) is pre-structured only to the extent of listing, as a reminder to the librarians, the features of each situation that recur consistently, e.g. approximate duration of action, where the action took place, how many people were involved. We also included the more frequent media of action such as letters, telephone calls and meetings. This helped to cut down the amount of writing for the librarians. The word 'letter', 'meeting' or 'telephone' could then be underlined, leaving the writer free to elaborate the primary area of 'action/decision'.

The diaries cover a period of two non-consecutive weeks in each library. Again, this helped to extend the time span studied, and gave each librarian a break in the somewhat extensive job of diary completion. We maintained close contact with the librarians during the diary period, collecting the forms each day from those librarians in or near to London, and supplying stamped addressed envelopes for each day for each person in libraries further afield. In this way we were able to discuss any queries as they arose. We have been fortunate in the willing and helpful co-operation of the librarians participating in the project, and are hopeful that because of their interest and our continued interaction we have accumulated useful descriptions of managerial and administrative activities.

We intend to use the original data collection forms as coding forms as well. The fixed features can be coded immediately to provide interim results in the form of tables showing approximate proportions of time spent in coping with the various media involved in the activities, such as planned versus unplanned meetings, paperwork and telephone calls. Finally an extensive analysis of the action part of each form is to be undertaken, and the results interpreted in relation to the information gathered at the various interviews.

We believe that, since knowledge is gained through experience (either one's own or the reported and accumulated experiences of others), at least one function of library research is to discover and analyse the experience of practising librarians. Man owes his survival as a species to his ability to learn from his experiences, to extract from events patterns of similarity and difference and to adjust his world view and his actions accordingly. Similarly, for the survival of an organization its managers must be consciously concerned with the mechanics of cause and effect, and the chains of interaction within the system, so that the problems involved in closing the gap between the existing state of affairs and the desired one can be solved.

Ackoff has said: 'For a manager to know what information he needs, he must be aware of each type of decision he should make (as well as does make) and he must have an adequate model of each... a decision model identifies what information is required and hence what information is relevant.' Our present study is in the nature of an exploration. We need to know what librarian-managers are doing at the moment before we can identify the most useful areas on which to concentrate our attention. If, as in research studies of industrial management, our project reveals that librarians are not always aware of how they spend their time, the knowledge could hopefully provoke a positive reaction (and not a nervous breakdown, as one librarian suggested). A redistribution of the workload or a stricter timetable could help to solve the problem—but a problem cannot be solved unless it is realized that it exists. We are not at this stage, then, attempting to join discussions on management philosophies, nor to sell the various principles and techniques that managers have made use of. Since much of the difficulty in solving problems is to ask the right questions in the first place, we are beginning by collecting a few questions.

REFERENCES

ACKOFF, R. L. Games, decisions, and organizations, *General Systems* IV, p. 145–50, 1959.
GILCHRIST, A. Cost effectiveness. *Aslib Proc.*, **23**, 9, September 1971, p. 455–64.
GILCHRIST, A. Further comments on the terminology of the analysis of library systems. *Aslib Proc.*, **20**, 10, October 1968, p. 408–12.
GILCHRIST, A. Work study in libraries. *J. Librarianship*, **2**, 2, April 1970. p. 126–38.
ROBERTSON, S. E., REYNOLDS, R. *and* WILKIN, A.P. Standard costing for information systems: background to a current study. *Aslib Proc.*, **22**, 9, September 1970. p. 452–7.
THOMAS, P. A. *A procedural model for the use of bibliographic records in libraries.* Aslib: London, 1970. Aslib Occasional Publication No. 4.
THOMAS, P. A. *and* EAST, H. *Th euse of bibliographic records in libraries.* Aslib: London, 1969. Aslib Occasional Publication No. 3.
WILKIN, A. P., REYNOLDS, R. *and* ROBERTSON, S. E. Standard costing times for information systems: a method of data collection and analysis. To be published in *J. Doc.*, June 1972.

The foreign language and translation problems of the social sciences

W. L. Saunders

Director, Postgraduate School of Librarianship and Information Science, University of Sheffield

Paper presented at a meeting of the Social Sciences Group, Imperial College, London, 18th October 1971

BY ONE of those coincidences that seem to abound in academic life and are probably not coincidences at all, we have recently found ourselves, quite suddenly, in possession of a very great deal of information about the language barrier and about the information requirements of the social sciences. This is a consequence of two recent publications: the Sheffield report on two years of intensive work on the language barrier in an academic community[1] and Bath University Library's INFROSS report.[2] The former looks at the language barrier from the point of view of all disciplines, including the social sciences; the latter looks at the information requirements and problems of social scientists from a very comprehensive point of view and includes amongst the problems that of the language barrier. The two reports therefore complement one another very well, and in my paper this evening I propose to draw on both of them, in an attempt to look at the language barrier from the social scientist's point of view. I shall normally draw more heavily on the Sheffield report than that of Bath—mainly because it is the one with which I am most familiar—though when I came to look at possible solutions, the Bath findings will certainly carry a good deal of weight, as you will see.

First of all, then, some general background detail and information about the projects which led to the two reports.

INFROSS was an OSTI-supported project carried out at Bath University under the direction of Maurice Line, with Michael Brittain and Frank Cranmer as researchers. It was an attempt to obtain an aerial view of the information needs of social scientists, in a variety of disciplines, both researchers and practitioners, in the UK. The aim was to acquire sufficient data to be able to state the requirements that a social science information system must satisfy, since in the absence of such knowledge a viable system is unlikely to be designed. The questions asked therefore all had some implication, direct or indirect, for some aspect of system design. The main research tool was a questionnaire aimed at social science researchers, of whom a national sample was drawn and nearly 1100 responded. Since previous knowledge of social science information requirements was almost non-existent, the area covered by the investigation was very large, and questions relating to language problems occupied only a relatively small part of the questionnaire. The lack of depth in any one part of the study would, it was hoped, be more than compensated for by the size of the sample and the ability to compare results across disciplines, environments, age groups, and so on. It may be added that now the results have been obtained, the Bath team is conducting further research into information system design, which will take them into account. The possibility of experimental translation services is also being considered as part of the new project.

Sheffield's language barrier project was also sponsored by OSTI. It was carried out under my direction by two independent research workers—John Hutchins and Betty Pargeter. Its origin lies in an earlier use study,[3] which analysed borrowing from the University of Sheffield over a one-year period, and which amongst other things seemed to reveal serious under-utilization of foreign language materials. If such a language barrier exists its direct and indirect consequences would be serious: the country's university libraries spend very substantial sums of money each year on foreign language books and journals, on the assumption that language is no barrier to a researcher if a book or paper is relevant to his research. If this assumption is incorrect, not only are resources being wasted, but even more important, the efficiency and quality of research is being adversely affected.

It was therefore decided to study in very considerable depth and detail the use of foreign language materials by the entire research population of Sheffield University. This comprised 644 academic staff, 498 research students working for Doctor's or Master's degrees by thesis, 180 full-time research workers and 217 others (principally clinical teachers, demonstrators and visiting staff): a total of 1,539.

Of these the Faculty of Social Sciences accounted for 83, spread over the departments of Accountancy and Financial Administration, Applied Economics and Business Studies, Economic History, Economics, Political Theory and Institutions and Sociological Studies. In this paper I shall sometimes mention other disciplines such as Geography and Psychology, which are often counted as social sciences but which are not in our Faculty of Social Sciences at Sheffield.

A very carefully structured interview was carried out with 851 researchers—over 55 per cent of the total population. What these interviews revealed, and the way in which the results were collated against other records and analyses of the population's actual library usage, will emerge as this paper progresses. In practical terms we were hoping that the results of the study would give a firm basis for assessing a university community's need for translation services, that light would be thrown on various aspects of general educational policy in regard to language teaching, and that some guidance on rationalizing university library stocks of foreign language materials would emerge as a result of the study.

It will be realized that the two communities which were studied are different in a number of respects; one is localized geographically, in Sheffield, though there is every reason to believe it is typical of any university community except, perhaps, Oxford, Cambridge and London. The INFROSS community on the other hand is widely distributed geographically and is not confined to *academic* social scientists, though they do in fact predominate. From the point of view of establishing whether a language barrier exists, the different composition should not introduce significant bias; if university social scientists experience problems, those outside universities are no less likely to.

In Sheffield our approach to the problem of the language barrier was to seek the answer to certain quite fundamental questions, and it is around these questions and the answers to them that I shall build this paper.

Firstly: *Is* there a significant amount of social science material in languages other than English?

Secondly: Assuming the answer to the first question is 'Yes', is full account being taken of this foreign language material by researchers in this country?

Thirdly: If the answer to Question 2 is 'No—full account is not being taken of it', what are the reasons for this?

Fourthly: If full account is not being taken of this material, whatever the reasons, does it in fact matter?

Finally: What courses of action are required to bring about an improvement in the present situation?

Considering first the amount of material, subjective impressions suggest that there is no shortage of foreign language contributions to all the social sciences and examination of any well stocked specialist social science library confirms this. Researchers at Bath expect in due course to have objective information about the size of the body of potentially relevant information in foreign languages, with emphasis on serials, as a result of the DISISS bibliometric studies, but at present there is a lack of really firm and definite information.

The analysis of Sheffield University Library's book and periodical stock which was carried out for our own project certainly shows no shortage of foreign language materials; indeed, 25 per cent of the library's book budget and about 35 per cent of its journals budget went on the purchase of materials in languages other than English. As would be expected, considerable variation exists between the foreign language holdings of particular subjects. In Ancient History, for example, over half the Sheffield book stock is in languages other than English, while at the other extreme the corresponding figure for Civil Engineering is only 3.3 per cent. An estimate was made of book stock in certain selected social sciences: Sociology, Statistics, Politics, Economics and Economic History. This showed a total of over 15,000 books, of which over 1,800—11.7 per cent—were in languages other than English. Although the proportion of such materials is low compared with most other subjects, there was clearly no shortage of books in foreign languages to draw on, if the users so wished. Interestingly, the proportion of material in French is consistently higher than in German—a marked difference from the situation in most other subjects. When we turned from books to look at holdings of foreign language *journals*, we found that of 483 social science titles (excluding Law, but including Psychology and Social Anthropology), 396 were in English, with 21 French, 9 German, half-a-dozen Russian and a good number of multi-lingual journals. In the library as a whole over 30 per cent of current titles are in languages other than English (including multi-lingual journals), so that this social sciences figure—at around 18 per cent—is well below the average. Even so, it is not insubstantial, and the point to be borne in mind is that all these titles have bee selected over the years by specialist academics who believe them to be of research importance in their fields. I think it is fair to say, therefore, that Sheffield's book and journal holdings suggest that there *is* quite a substantial amount of significant foreign language material in the social sciences. Between the library's own holdings and the usual inter-lending channels there was perfectly adequate access to this material; and what is true of Sheffield is no doubt true of the large academic populations covered by INFROSS, and probably also true of the non-academic researchers covered by INFROSS. What all this seems to add up to is that the answer to my first question is 'Yes: there *is* a significant amount of social science material in languages other than English.'

The question which follows from this is whether or not full account is being taken of this material by workers in this country. INFROSS throws interesting light on one aspect of this: it found that of those who had any foreign language knowledge at all—which was just over four-fifths of their population—only a third regularly scanned foreign literature and of this third, two-thirds scanned the literature in French, only one-third the German literature and a mere 4 per cent the Russian. Within these figures could be seen marked differences between individual disciplines and between types of community. Respondents from Colleges of Education, Government departments and other research institutions were less likely to scan foreign materials than others. Respondents whose research was applied were less likely to scan than those whose research was not; those working in international or comparative areas or areas involving frequent use of historical material were *more* likely to scan than others; Geographers, Anthropologists and Political Scientists were more likely to scan than representatives of other disciplines.

Sheffield's findings on this matter take a rather different form. An attempt was made to analyse every type of relevant activity carried out by the population in question: their total library borrowings over a full year, their Xeroxing of foreign materials, also over a year; a full year's inter-library loans; and the extent of their scanning of foreign language journals inside the library. The results are extremely revealing. Total borrowing over the year shows the social scientists to be the heaviest borrowers of any Faculty in the university. Only 5 per cent of them borrowed nothing at all, and the average borrowings were 46.4 per head—over twice the average for the university as a whole, and heavier, even, than the humanities. On the other hand, the proportion of this borrowing which was in foreign languages is *lower* than any other group in the university—a total of only 51 items over 79 borrowers. Furthermore, three departments—Accountancy, Applied Economics and Politics, borrowed none at all: the Politics figure, incidentally, in curious contrast to the INFROSS findings for foreign language scanning. Xeroxing figures were abysmally low for the social scientists—they accounted for only one item of the 474 foreign language Xerox copies made during the year. Inter-library loans tell a similar story: only six social scientists borrowed foreign items from elsewhere—a total of eleven inter-library loans between them. Looking at borrowing, Xeroxing and inter-library loans as a whole, the average was 0.7 per social scientist, not much more than a quarter of the average for the university as a whole and less than *half* of the average if the humanities—who are very heavy users of foreign language materials—are excluded. If amongst this very low level of usage we look for a dominant language, it is French: there is nearly three times as much material in French as in any other language.

When we attempted to measure consultation of current foreign language journals *inside* the library, over a full term, we found that nearly a quarter of the entire university population made foreign language consultations of this sort, and averaged 7.5 consultations, i.e. 2,615 consultations by 350 persons. For the Faculty of Social Sciences, however, only 14.5 per cent of the group consulted foreign language journals and they averaged only 2.2 consultations per person. Again, the social sciences show up very badly not only in absolute terms but in comparison with all the other university disciplines.

To round off this part of our investigation we looked at citation practices. The citations from every publication and every thesis produced by the university staff and research population during a full year were analysed in detail: over 35,000 citations from 999 items. The social sciences showed a higher proportion of English language citations than any other Faculty—only 28 foreign language citations out of a total of 939, with only two departments, Economic History and Sociology, accounting for all of them.

From all of this I would submit that the case for low-utilization by social scientists of foreign language materials is pretty conclusively established. This brings us to my third question: *Why* is this so?

The obvious reason which springs to mind is a low level of language competence amongst social scientists. Is this in fact the case? INFROSS showed that 75 per cent of their population had French, 27 per cent could read German and only 4 per cent Russian. At Sheffield the figures are very similar. By the criterion of being able to read a research paper in the language in question, 77 per cent had French, 26 per cent German and less than 2 per cent Russian. The French figure, though high, is very well below the average for the university as a whole, and the figure for German is only half that for the total university population. Remember, of course, that these findings are derived from only one university—Sheffield—and I ought to mention at this point that INFROSS finds respondents from Oxford, Cambridge, the new universities and the Scottish universities more likely than the others to be able to read a foreign language. They also report certain *subjects* as better than others, including Anthropology, Political Science, Geography, and Economic Statistics. Also, senior researchers were found to be better linguists than their juniors and Sheffield's findings broadly confirm this. Whether they are senior because they are better linguists or whether they are better linguists because they have been around longer is a nice point for speculation!

Language knowledge—or lack of knowledge—is not the only influence at work, however. INFROSS reports relatively poor use of abstracting and indexing periodicals in general, which means that most researchers are underexposed to foreign language materials—such comprehensive and important tools as *Bulletin Signalétique* and *Referativnyi Zhurnal*, for instance, were hardly ever mentioned. The Sheffield study also identifies lack of general bibliographical expertise as a weakness. This comes out for instance in the amount of significant *English* language material which social scientists confessed to having discovered late in their research—though they are no worse in this than other Faculties. In the case of foreign material, even if references *were* found they were by no means bound to be followed up: more than half the social scientists who did find *German* references, for instance, did not bother to follow them up to check if they were relevant. In this they were either much worse or more honest than other Faculties. INFROSS reports a third of the population as considerably more reluctant to follow up a foreign language reference than an English one, and singles out Psychologists as being particularly likely to behave in this way. They also note that researchers with limited facilities for translation are not only less likely than others to expose themselves to foreign language material, but that when they do they are less likely to follow it up. Lack of awareness of translation indexes and facilities, plus the inability to finance translations, was certainly a very common finding in the Sheffield study, too.

All in all there seems to be a considerable complacency about foreign language materials. The high proportion of Sheffield social scientists—over 50 per cent—who claimed they had no language problem was higher than for any other Faculty and *very* much higher than most. The INFROSS study states quite firmly that either the social scientist finds the foreign language question largely irrelevant to his research or *rationalizes* his own linguistic inability into the supposed irrelevance of foreign language material. The evidence from both Sheffield and INFROSS seems to point to the latter, though as INFROSS concedes, some kinds of social science research—especially applied research—may not travel well.

Which leads into my fourth question—if full account is *not* being taken of foreign language materials, whatever the reason, does this matter? Two elements in the Sheffield study are particularly relevant here: researchers were asked to assess the relative importance of research in other countries and also whether or not important work in other countries might have been missed. Nearly a third of the social scientists rated France as an important source of research and over a quarter Germany; certainly not so high as in many other Faculties, but nevertheless very substantial testimony to the importance of these countries. Furthermore, nearly a third of all social scientists believed they were *probably* missing significant foreign work and over a fifth thought this might *possibly* be the case. Only a fifth gave a definite 'no' to this possibility. France was believed to be the source of nearly 15 per cent of the important work which may have been missed, and Germany nearly a quarter. Russia and Italy each account for over 10 per cent. All in all the evidence of the Sheffield study adds up to quite a powerful case for the importance of foreign language publications in the social sciences and a substantial awareness of this fact by the social scientists themselves, even if their own use of these materials is so very limited.

These, then, were the *facts* revealed by the two investigations, and I might aptly quote here from the Sheffield report a paragraph which rather sums the situation up: '[It has been] demonstrated conclusively that work in foreign languages is of considerable importance to the research activity of the community which was surveyed; that there is evidence of lack of knowledge and under-utilisation of such work, due to the barrier of language; that . . . the four languages to which particular importance is attached are French, German, Russian and Japanese; and that the situation with only one of these—French—can be regarded as reasonably satisfactory'.

What, then, should we be doing about it? The final part of this paper will be concerned with possible solutions put forward by the Sheffield Report and by a working paper from Stephen Roberts, based on ideas from the Bath team.

One *obvious* possibility is to improve the language competence of researchers. The Sheffield Report stresses the importance of giving more emphasis to language teaching—particularly German and Russian—in the schools, but the Bath paper sees this as at best only a long-term solution: they stress the greater linguistic complexity of social sciences as compared, for instance, with pure science and technology. Similarly, Bath sees little significant hope of progress through encouraging *researchers* to improve their foreign language competence, since their motivation to do so is likely to be rather weak. Sheffield sees this rather differently. While agreeing that motivation is weak or non-existent at undergraduate level it is felt that it would be well worth while to improve facilities and make greater opportunities available for university teachers, postgraduates and other research workers to learn at the outset of their research careers the languages important to their specializations. It seems particularly significant, for instance, that ability to read a research paper in German is found in far more research workers than had learned it, formally, at school; if a language seems important to their research, many researchers are clearly willing to learn it for themselves, and our study also showed a remarkable willingness on the part of people having some knowledge of a language to have a go at translating for themselves. And the improvement of language ability with seniority is worth mentioning, too, though obviously quite a complex of factors apply here.

One recommendation on which both reports are agreed is the value of outline translation services—included by Bath under the apt heading of Linguistic Aid Services. These would be on the NRLSI model by which a researcher with a paper in a language he can not deal with, brings it along to an expert in that language. Together they then produce a quick outline—one providing the subject expertise, the other the language knowledge. In this way it can usually be determined quite quickly whether or not a full translation is justified. It is considered best to base this service on the library: the library staff usually includes linguists who would surely welcome a few hours a week of this sort of activity; being librarians they would also have the bibliographical expertise to run English language summaries or abstracts to earth, if they are available, and to know about access to translation services and indexes such as those held by Aslib and the NLL. Also, being in the library, they would have the literature base right to hand. Screening by such an outline service is seen as the essential preliminary prior to demanding expensive full translations; and incidentally, there is no reason for restricting this service and this channel just to university users; there seems obvious scope for co-operative service here, perhaps for a whole region.

For the next step—full translations—there seems to be a clear need for a national centre and the Bath paper also makes the point that an essential preliminary is a register of social science translators and a survey of the existing stock of social science translations. Sheffield sees the centre as possibly being an extension of NLL's present service in Russian to cover all languages and the report particularly stresses the great demand for translations from German. Those working on the Bath project have probably given more thought to and done more work on the actual requirements and problems of such a centre. One problem they mention, for example, is the absence of a common body of identifiable materials in foreign languages which can provide a re-usable core of translated materials and act as a stimulant to demand and for the production of further translations.

Since the cost of translations emerged as a considerable deterrent during the Sheffield investigation, it is recommended that an element for translation be included in the costing of research grants; though as has been rightly pointed out, such an element would be very difficult to assess.

At the bibliographical end Sheffield identifies a need for English translations of article titles in current awareness publications such as *Current Contents*, and the fairly obvious point is also made that research papers should be provided with multi-lingual summaries. Mr Roberts, in agreeing with this, rightly mentions the difficulty of direct action to bring it about, and suggests that the best approach is to employ linguist/documentalists at the document processing and input stage. He mentions too the potential value of reviews of the literature—if they were better known to social scientists; and it is relevant to mention that only 3.3 per cent of Sheffield social scientists had used reviews to keep up with research, compared with 17 per cent of the total population. He also considers the possibilities of collections of selected, translated articles. He is dubious, however, about cover-to-cover translations on grounds of economic viability, low use, delays and the wide scattering of social science material. Sheffield, on the other hand, sees quite a bit of virtue in encouraging cover-to-cover or selective translation of at least the really important German and Japanese journals. It would be worth trying to get more evidence from other sources on this particular matter—which is certainly very important.

Both Sheffield and Bath note the multiplicity of sources of translation and similar services and it is clear from Chapter 2 of the Sheffield survey, which reviews recording translations, locating translations, and translations services, that there is scope for a good deal of rationalization of the present rather chaotic situation.

Finally there is probably quite a lot that could be done by library staff themselves to improve the present situation, and without a great deal of trouble or expense. Bath stresses the value of user education, and successful experience with their experimental information officer service encourages them to feel that the right approach is probably to go out and offer a service and test out their various hypotheses experimentally. Sheffield, too, lays stress on actively promoting the use of existing facilities and also recommends a relatively simple service that some universities are already providing—namely the compilation of lists of local translators. The last of the Sheffield recommendations seems to be quite an appropriate one on which to conclude this paper. It reads: 'It should be ensured that library staff who actually deal with library users are themselves aware of the full range of translating services and possibilities.' I wonder how many of you in this room tonight could put your hands on your hearts and say this recommendation doesn't apply to you?

REFERENCES

1 HUTCHINS, W. J., PARGETER, L. J. *and* SAUNDERS, W. L. *The language barrier: a study in depth of the place of foreign language materials in the research activity of an academic community.* University of Sheffield Postgraduate School of Librarianship and Information Science, 1971. 306 pp.

2 BATH UNIVERSITY LIBRARY. *Investigation into information requirements of the social sciences. Research report no. 1: Information requirements of researchers in the social sciences.* 2 vols. 1971.

3 SAUNDERS, W. L., ROBERTS, E. W. *and* WICKISON, L. J. Survey of borrowing from the University of Sheffield library during one academic year. *In:* SAUNDERS, W. L. *ed. Provision and use of library and documentation services.* Oxford: Pergamon Press, 1966, p. 115–43.

DISCUSSION

MR M. BRITTAIN (Bath University): 'Do you think that the evidence from the Sheffield and Bath studies shows that the language problem in the social sciences is substantially different from the language problem in the sciences? Further, if this is the case, would you argue for a solution in the social sciences which is different from existing and proposed solutions to the language problem in science?'

PROF. SAUNDERS: 'Yes, it does appear to be substantially different but it is difficult to visualize *totally* different solutions; the emphasis on, and importance attached to, particular solutions may well differ from one subject or group of subjects to another, but this is not a matter to which we gave any extensive consideration.'

MR BRITTAIN: 'The figures you give from the Sheffield study for borrowing, Xeroxing and inter-library loans of foreign language material do not show great absolute differences between social scientists and other users in the university. The average for the social scientists was 0.7 and you say this is not much more than a quarter of the average for the university as a whole—which means that other users average about 2.8 borrowings. On this evidence the extent of use of foreign language material as revealed by borrowing is not great: there is no indication that non-social scientists are making great demands for foreign literature. As you say, scientists cite a great deal more foreign literature than do social scientists. It would be interesting to know why this is so. Presumably scientists make greater use of the foreign language material they do borrow than the social scientists.'

PROF. SAUNDERS: 'I agree that the absolute totals are not very impressive but the *relative* levels seem quite significant. Borrowing is of course only part of the story in any case. On the final point, there could be other reasons than more intensive use of what they do borrow, but we have no firm data on this: it may merit further study.'

MR BRITTAIN: 'We have not shown beyond doubt that the social science material which undoubtedly exists in languages other than English is of relevance to the majority of English language speaking social scientists. I am doubtful if we have satisfactorily answered your fourth question. You base your judgement on assessments made by social scientists about the relative importance of research in other countries, and your social scientists rate France in particular as an important source of research and Germany to a smaller extent. However, in many cases social scientists are in no position to assess the relevance of, and the need for, foreign language material, or, indeed, to know of the extent to which it exists—except perhaps by hearsay. As we have seen, only a very small percentage can read Russian, 27 per cent German, and 75 per cent French. But not all of those who can read foreign languages regularly scan the material. Only about one-third of those who can read French regularly scan the literature (this amounts to about one-quater of all respondents in the INFROSS study) and only one-third of those who can read German scan the German literature regularly (that is, only about eighty of INFROSS respondents). Therefore, the evidence that INFROSS has about the relevance of social science material in foreign languages comes from only a minority of social scientists in the sample; and I suggest that the social scientists who are aware of the full extent of the language problem and who could give valid answers to questions about the relevance of foreign language material to English language users may be atypical.'

PROF. SAUNDERS: 'This is a difficult one to answer with certainty, but I would have thought the evidence I put forward was fairly strong. Wouldn't you think that researchers can form views on the importance of research in a particular country without necessarily being able to read the language in question?'

MR J. PEMBERTON (Warwick University Library): 'Are universities buying foreign language social science books too soon after publication? Could they do better by waiting to see if foreign books are going to be translated into English? Clearly this would require research into the average delay in publishing translations of books. Had Professor Saunders checked on whether the foreign-language books he had counted in Sheffield University library had eventually been translated into English?'

PROF. SAUNDERS: 'We did not go into this particular matter but it certainly seems to be worth following up further.'

MR PEMBERTON: 'In my experience, foreign-language books in the social sciences are usually requested by fairly senior—or at least advanced—academic staff. Use of those books can, therefore, only be expected by the small number of people involved. To assess levels of usage of foreign-language material by producing figures based on surveys of the reading patterns of whole departments will, therefore, give a distorted picture. The danger is that conclusions drawn from such surveys might suggest a low level of use of foreign-language books generally, and lead to pressure from administrators for libraries to spend less on them.'

PROF. SAUNDERS: ' "Quality" of use and users is hard to assess, of course. I quite take Mr Pemberton's point and would say that quantitative "use" criteria should rate just as much or just as little importance with foreign language purchases as with any other selection decisions that university librarians have to make.'

MR N. DUMBLETON (Open University): 'I would like to emphasize the importance of immediacy in a translation service. A researcher wants to know without delay whether a foreign language article or report is relevant to his work. Hence the value of publicizing and using the library staff's own language knowledge for on-the-spot scanning. If such a service created too great a demand the library could cut its foreign language book budget by a third and use the money to employ a professional translator/abstractor. This would greatly increase the use of the remaining foreign language materials at no further cost to the library.'

PROF. SAUNDERS: 'I agree that immediacy is an important factor, but I should want more data before being able to comment on the second part of Dumbleton's observation.'

MR M. B. LINE (Librarian, NCL, formerly of Bath University): 'Perhaps limited (and decreasing) use of foreign literature is due in large part to the increase in volume of publication —the more there is to read, the more one is inclined to read the material in one's own language and avoid the others.'

PROF. SAUNDERS: 'Agreed. Only today a scientific colleague told me that, while not denying the importance of foreign language materials, he found it near impossible to keep up with English language contributions.'

MR LINE: 'Cover-to-cover translations tend not to be current, nor to provide a really good selection of foreign literature: recent research at Bath University suggests that it would be far more useful to translate 10 per cent of the articles in ten times as many journals rather than 100 per cent in a few.'

PROF. SAUNDERS: 'An interesting point: we could do with more information on the whole matter of cover-to-cover translations.'

MR LINE: 'For DISISS we are asking experts in a field to identify what they consider to be key articles in Russian, and will ask NLL to translate these. We shall publicize the existence of these translations, and see what happens. We may be able to see whether any one article generates much demand, or whether demand is scattered over them all, or whether there is any significant demand at all. One of the problems with an on-demand translation service is that, while in science the probability of an article translated for one person being wanted by another is quite high, in the social sciences it may be low.'

MR M. GUHA (University of Sussex Centre for Contemporary European Studies): 'The social sciences are the American sciences—most of the literature used, even by French and German social scientists, is in English, and the proportion is increasing.'

PROF. SAUNDERS: 'I agree that American literature is extremely important—I think the USA was considered by the social scientists in our survey to be the most important single country from the point of view of research. Nevertheless, this it not to say that foreign language literature is not also important, and our Sheffield survey suggests that it definitely is.'

MR A. HORTON (University of New South Wales): 'Did either survey reveal the reasons why material in any language was sought. Experience shows that many approaches to the library are by people who already have identified the article needed.'

PROF. SAUNDERS: 'We have no specific information about this.'

MRS S. GAHAGAN (British Aluminium): 'A University community like Sheffield should be able to draw on Language Sections and on exchange of material from foreign universities and the senior staff should disseminate this and not keep it to themselves. Also, foreign university libraries should be able—on a reciprocal basis—to supply lists of significant publications. They would perhaps be glad of reciprocal lists, particularly as the output is so much greater.'

PROF. SAUNDERS: 'Our survey showed that it is something of a myth to think that because a university has a department teaching a particular language it should be possible for anyone with a problem in that language easily to get help from them. It is not that the language departments are hostile or unco-operative: the scale of the demand would make their positions insupportable. Individuals might go to personal friends in language departments but we found that people are much more likely to turn to colleagues in their own departments, if they are known to be proficient in a particular language. Full details of all of this are to be found in the survey.'

MR D. E. ALLEN: 'In at least some of the social sciences the demand seems to be for translation of complete books rather than individual papers—a markedly different pattern from the natural sciences. The problem, of course, is that the market for translated books is normally not nearly large enough to make this economic.

One wonders how important Japanese is going to become. Perhaps the solution in the case of such 'unfamiliar' languages is to charge the university centres specializing in particular foreign areas with a national responsibility for keeping a stock of translated texts which can be borrowed.'

PROF. SAUNDERS: 'I quite agree with the first point. I also get the impression from our Sheffield findings that Japanese is becoming important and that in many disciplines research workers believe they may be missing important contributions.'

Patents as a source of technical information

K. M. Saunderson

Deputy Head, Technical Intelligence and Library,
ICI Plastics Division

Paper presented at a meeting of the Chemical Group, 14th September 1971

I MUST START my paper with two disclaimers. Firstly, I will not be concerned with the legal aspects of patents other than as these may arise in the context of a discussion of the reasons why patents are an important source of technical information and the ways in which the information that they contain can be utilized.

Secondly, in so far as I describe methods for using and searching the patent literature, this will reflect on the activities of the Information Unit of Technical Intelligence and Library of the Plastics Division of ICI, and in no way is it to be construed as indicating practice in other departments of Plastics Division or in the other parts of ICI.

SUMMARY

What I shall attempt in this paper is, after an introduction, to consider the utility of patents as sources of technical information and discuss methods by which this information can be made available to users.

The user population which I have particularly in mind is that comprising the scientists and technologists of industry who are involved in research and development. But I believe that what I have to say is of more general import and is applicable in whole or in part to any who are engaged in scientific research and development, regardless of the type of establishment in which they are employed. It is as appropriate to those working in Universities, Research Associations, Government establishments as to those in industry.

Also, no discussion of patents as a source of technical information will be complete unless it includes some consideration of the role of the information officer in making the information available to his users.

INTRODUCTION

In a highly competitive industry, or one subject to rapid growth, or to rapid technological advance, or, indeed to any combination of these, patents and the information which they contain are of vital importance. If maximum use of this information is to be attained, then the patents and/or the information have to be organized.

At this point let me digress for a moment to give you some idea of the size of the data-base we are considering.

From seventy-three of the countries which grant patents and for which the 1969 details are available, some 370,500 patents and 26,400 inventor's certificates —a total of 396,400—were granted in 1969. Also in 1969 and in these same countries, over 650,000 applications of which 40–45 per cent are equivalents, were filed and the majority of these will eventually be published.[1] In the same year 252,320 abstracts were published in *Chemical Abstracts*.

After allowing for equivalents, I estimate that well over 100,000 first issue patents of direct (that is patents dealing with the various aspects of chemicals, polymers, metals) and indirect (instruments, machinery) concern to the chemical industry were granted in 1969.

The figures which I have just quoted serve not only to show the size of the data-base but, I am sure you will allow, give credence to my statement that in order to maximize the utilization of the information which patents contain organized files have to be created. Ordered files of patents or of 'abstracts' of patents constitute an important aid to those responsible for decision-making in industry in respect of both commercial and technical decisions.

From files arranged according to patentee/assignee, a watch can be kept on the activities of competitors. One can deduce the areas in which a competitor's strength lies, the direction of his development, and obtain a shrewd idea of his viability. A falling off in the level of patenting is often a pointer that all is not well with Bloggs International.

Files arranged by subject provide a means for accessing technical advances which may not have been 'written-up' in any other medium. At a recent Aslib meeting a comment was made on the apparently differing publication habits of university scientists and industrial scientists. In 1969 the latter wrote, or assisted in the writing of, approaching 340,000 non-equivalent applications for the grant of patents—they can perhaps be forgiven if they are less prolific than their university colleagues in respect of other forms of publication.

Year by year scientists are becoming increasingly appreciative of the value of patents as a source of technical information and this fact has not escaped the notice of certain publishing houses. Over the course of the past fifteen years or so these publishers have come to realize that a market exists for packages which facilitate the accessing of part, if not yet the whole, of this wealth of information. As examples of publishers whose present day prosperity stems solely or in large measure from their activities in this area, from the UK I can cite the case of Derwent Publications Limited and from the United States, Information for Industry Inc.

Whilst these services are concerned solely with patents and are oriented towards providing for the requirements of the chemical industry, a number of the tape services which have flooded on to the market over the past few years include patents in their data-bases. For example, from the UK there are the INSPEC tapes and from the US the AIP service.

I have touched briefly on the user and on the publisher. A word about the information officer.

A consequence of patents or abstracts of patents being part of the essential reading for industrial scientists is that staff of information departments have had to become as familiar with handling the patent literature as they are with the journal literature. In the context of the subject of this paper, information officers have had to acquire a sound working knowledge of the facilities available to them at and through their national Patent Office. They have had to become aware of other local, national and international services and agencies which may be of assistance in this area. For the benefit of the innocent first getting to grips with patents, they need an appreciation of the more important classification schemes which are applied to patents.

The position of the information officer is central to the utilization of information contained in patents.

PATENTS AS SOURCES OF TECHNICAL INFORMATION

I would now like to discuss some of the reasons why patents are, or should be, essential reading for those concerned with research and development, whether in industry or elsewhere. There are, I believe, three reasons which outweigh all others in importance. These are:

(1) The effects of recent changes to patenting procedures in a number of countries.
(2) The competitive nature of industry.
(3) The increasingly international nature of companies.

Let us consider these in turn.

(1) The effects of changes in patenting procedures

It is from patents that one frequently obtains the first details of a new invention. Whilst to an extent this has always been so, today, following the trend towards examination of patent applications after publication and away from examination before publication, the probability that this will occur has been considerably enhanced.

During the past decade we have witnessed, or are about to witness, this type of change to the patenting procedures of four industrially important countries—the Netherlands, West Germany, France and Japan—and if the recommendations of the Banks's Report[2] are accepted and implemented a similar change to British patenting procedures will result. Further, there have been rumours that the USA is considering a similar change to its procedures.

An important side effect of this type of change to patenting procedures in industrially advanced or advancing countries to both our users and ourselves is that it becomes entirely probable that patent applications will be laid OPI [Open to Public Inspection] well in advance of publication of corresponding articles in the journal literature.[3] This effect is amplified by the time lag between submission and publication of papers in journals.

As an aside, it is interesting to note the situation which is developing. In so far as the journal literature is concerned, there is increasing support for the lobby calling for more refereeing. Equate this to examination for novelty? For patents the trend is directly opposite—open the flood gates and allow publication of up to around 700,000 unexamined applications a year.

(2) The competitive nature of industry

The totality of world industry is on the increase. Not only is it expanding in those countries which already have an established industrial environment, but it is developing in the emerging nations and those which to date have been largely reliant upon a rural economy. Consequently the competitive nature of industry is becoming more intense. Companies with a near monopoly in a particular area, or those in the forefront of technological advance, or those in fields subject to a high measure of competition find it necessary to limit the amount of 'open' publication which they allow of details of their products, processes, plant and equipment to that required in the filing of patent applications.

It follows, therefore, that the careful reading and interpretation of the technical content of patents has to be recognized as being an integral part of the responsibilities of subject specialists in industry.

(3) The increasingly international nature of companies

With inflation rife and companies needing to achieve the full advantages of 'economies of scale' we are in an era of mergers, take-overs, agreements of one type or another which transcend national boundaries. World economy today is dominated by the international companies. Of those chemical companies having group sales of more than $500,000,000 for 1970 few operate within the confines of a single country.[4]

However, not all have a full research and development organization in each of the countries in which they have manufacturing sites. Centres for R and D are established which support their activities in two or more countries and staff at these centres have to be knowledgeable concerning relevant work in progress in several countries. Since there is a limit to the amount of time that R and D personnel can devote to reading, I contend that the most efficient way by which they can acquire the knowledge they need to have is by regular screening of appropriate patents.

Generally speaking patents are issued in neat packages, even in those countries publishing two or more series. Screening for relevance to the activities of a particular working group can be effected fairly easily, once the interests of the group have been defined—and the probability that an important patent will be overlooked is low.

On the other hand papers relevant to the activities of the working group may well be published in a considerable number of journals. Albeit that the majority will appear in the nucleus of hard core journals, nevertheless screening for relevant papers can be far more time-consuming than is screening for relevant patents and the probability of missing an important paper—the title may be misleading, it could be published in an unlikely journal—is higher than is the probability of overlooking an important patent.

Although I have not spelt it out explicitly, what I have so far been considering is the importance of patents as sources of technical information for current awareness. Two of my three main arguments for their importance in this regard lead logically to an appreciation that patents are equally important in retrospective search.

The trend among the industrially important countries towards publication before examination (point (1) above), and the increasing probability that certain information will be only found in the patent literature (point (2)) coupled with the facts of:

(1) the size of the data-base—comparable to that of *Chemical Abstracts*
and
(2) that patents can contain good, solid technical information,

surely make it axiomatic that a 'literature search' preceding, say, the grant of a capital sanction for a research project, cannot be considered to be complete unless and until the patent literature has been scrutinized.

The responsibilities of the information officer

In my opening remarks I made the statement that 'the information officer is central to the utilization of the information contained in patents'. By this I meant that if our colleagues in research and development, be they chemists, physicists, or engineers, are to be in a position to maximize their utilization of the information contained in patents, then we have an obligation to make available to them the means by which they can attain this end.

At the recent Cranfield Conference, one of the speakers said that he perceived that, in common with other areas of endeavour, the Information Field has its 'in word' of the year. We had had the year of the 'feature card', the year of the 'user' and so on. I came away from Cranfield feeling that a candidate for this year is 'the information broker'. The sense in which this concept was used was of an agency or organization which repackaged a large data-base into a number of smaller data-bases more appropriate to the needs of individual user populations.

I suggest that at this moment of time, in respect of the patents data-base, we have to fulfil a similar function on behalf of our users. The librarian or information officer has accepted for many years that scientific and technical personnel, other than those working in narrow and highly specialized fields, cannot keep themselves fully informed of relevant papers through their reading of primary journals and have provided bulletins of abstracts as an aid to them in selecting which originals they really need to read. He must accept the obligation of making available to his users succinct, technical summaries of patents.

In the way that libraries have held runs of selected journals for consultation by readers, so selective holdings of complete patent specifications must be readily accessible to users. Libraries and information units have been avid collectors or compilers of indexes to the journal literature—they need to direct equal attention to indexes and indexing of patents. I believe that I cannot emphasize too strongly that the services provided to users in respect of patents must parallel those provided to them in respect of the journal literature.

But our responsibilities do not end here. There is now on the market a multiplicity of information packages in both hard-copy and computer manipulable forms. Too few of the publishers of these services appreciate to the full the importance of patents and in too many cases there is scant coverage of patents in the data-base. Here is an example from a familiar area.

In 1970, from twenty-six countries, *Chemical Abstracts* covered 76,000 patents, of which 43 per cent were equivalents. They covered, therefore, around 43,000 first issue patents. Derwent Publications Limited, in 1970, the first full year of its *Central Patents Index,* covered around 95,800 first issue patents from twelve countries.

Allowing for differences between the two sets of criteria for selection I submit that *Chemical Abstracts* is not giving comparable coverage of patents to that that it gives of the journal literature.

I suggest that we have an obligation, on behalf of our users, to bring to the notice of the publishers the importance attached to patents as sources of technical information and to press for adequate coverage of patents in the databases.

PROVISION OF THE NECESSARY SERVICES

In the preceding section I have given what I consider to be the responsibilities of the information officer. I shall now review ways by which these responsibilities can be discharged. That is, in this section I shall be considering methods for providing the tools which will enable scientists and technologists to utilize more easily patents as a source of information.

Summaries of patents (abstracts)

The first responsibility that I gave was the provision of succinct, technical summaries. From now on I shall refer to these as abstracts.

The type of abstract required depends on the activity of the user. A polymer chemist requires details of recipes and reaction conditions. Technologists and engineers are best served by the provision of annotated copies of the main drawings. Pharmaceutical chemists need to have chemical structures and statements of utility; and so on. Therefore, the more homogeneous the user population the easier it is for the information officer to meet the needs.

Invariably there is some conflict in requirement and a compromise has to be adopted. Having resolved this problem, then a decision has to be made on the source of supply of abstracts. The three options available are:

(1) In-house abstracts prepared from copies of specifications.
(2) Selection of relevant abstracts from one or more of the compendia of abstracts available from official and commercial sources.
(3) Distribution of copies of bulletins of abstracts as purchased from a publisher.

The first two alternatives are of general applicability but the third is restricted to certain sectors of the chemical industry. Each method has advantages and disadvantages.

(*1*) *In-house prepared abstracts*

Advantages: Relevance will be high since only patents of concern to the user population will be abstracted. The delay between publication of the patents and receipt of abstracts by the user should be the least of the three methods.

Disadvantages: Preparation of informative abstracts is an exacting task. A high level of competence in at least the Western European languages is required. Since most information units have to work within financial and establishment budgets, there is a limit to the effort which can be devoted to the handling of patents. The usual consequence is that country coverage is restricted. Bulletins have to be typed and printed.

(2) *Selection from published abstracts*
Advantages: Relevance is high—only those items related to the activities of the users are selected. The process of abstracting does not have to be undertaken. At least in respect of the chemical industry located in English-speaking countries there is an adequate supply of compendia from which to make the selection. Country coverage is improved on that which can normally be attained from in-house abstracting.

Disadvantages: The quality of abstracts is very variable and it is often apparent that certain abstracts have not been prepared by a subject specialist or that insufficient attention to detail has been given. If selection is from commercially published sources there can be a considerable delay between publication of the patents and receipt by the user of the corresponding abstracts. Bulletins have to be typed and printed.

(3) *Distribution of purchased bulletins*
Advantages: Relevance and quality of abstracts are generally of an acceptable level. Country coverage is reasonable. Abstracting and bulletin preparation are both the responsibility of the publisher.

Disadvantages: There is delay between publication of the patents and receipt of bulletins. It is possible that the totality of one's interests will not be covered by a single bulletin, making some form of 'topping-up' necessary.

By indicating some of the advantages and disadvantages of the three methods of acquiring abstracts, I have given you some idea of the factors which the information officer has to take into account when coming to his decision. Unfortunately not all scientific disciplines are as well served with patent abstracting services as they are with journal literature services and the information officer may well find that he has no choice open to him. The required abstracts may well have to be prepared in-house.

Copies of patent specifications

Now let me consider briefly the second responsibility that I cited: the provision of holdings of complete patent specifications.

The increasing probability that certain technical information will only be found in patents makes it of paramount importance that a collection of relevant 'hard-core' patents should be available in the way that are runs of 'hard-core' journals. It is immaterial whether the patents are housed in a main library or in a library associated with a patents department. What does matter is that they should be freely available to all potential users.

In that storage space is at a premium in many libraries, it is necessary to decide whether to obtain or keep copies of patents as hard copy or in microform. Selected patents can now be obtained on microfilm and microfiche and as aperture cards. Whilst microform has the advantage over hard copy of compact storage, nevertheless there is still a reluctance on the part of users to sit at a viewer, added to which a serried rank of viewers is needed if a reasonable measure of flexibility of access is to be offered.

In practice it is probable that the optimum solution is to have the total collection on microform and this supplemented with hard copy of the most important patents.

Indexes to patents

As the third responsibility I listed the provision of indexes.

In the context of patents as sources of technical information, I suggest that subject, patentee/assignee and equivalents indexes are needed. Why are these needed? Think for a moment about the types of questions which are asked or should be asked:

> 'Have you any information about . . . ?'
> 'Has x done any work on . . . ?'
> 'I can't read Japanese. Can I have a translation please?'

Answer the first from a subject index; the second from a patentee/assignee index; use the equivalents index to determine if the patent has been issued in a country whose language he can read.

Let us consider subject indexes in a little more detail.

Subject indexes

If justification for the expenditure of time or money on the provision of subject indexes to patents is required, this can be obtained from the arguments which I put forward to support my case that patents are an important source of information. It should be an automatic reaction to a request for a 'literature search' to screen for relevant patents.

To be in a position to do this the information officer needs to have available to him indexes which are as detailed and into which the information is indexed as comprehensively as in the case of the journal literature. Classification of the claims according to a few broad subject headings is not good enough.

The options on availability of indexes closely parallel those for abstracts. They can be compiled in-house; purchased from official and commercial sources; or searching can be passed to one of the many agencies which undertake this type of work.

In-house indexing

A moment ago I said that, from the view point of searching patents for the information which they contain, classification of the claims according to a few broad subject headings is not sufficient. It is inadequate because:

(1) much of the detail required by the user is found within the body of the specification and this detail may well not appear in the claims;

(2) broad indexing means broad searching with low relevance and substantial recourse to originals in order to provide the user patents relevant to the subject of his enquiry.

I suggest that in order to optimize all factors which have to be taken into account concerning both indexing and searching, the minimum which needs to be indexed comprises the assignee, object, examples and claims, together with, for 'chemical' patents, the preferred materials. Further, I suggest that in so far as 'concepts' are concerned, and by concepts I mean all aspects apart from chemicals that require indexing, the day of the fixed code or indexing schedule has long passed and that either a dynamic thesaurus or a text search approach should be used.

I suppose that if pressed we would all claim that no outside source can index for our needs as well as we can for ourselves. But we use published indexes to other forms of publication, so why not to patents.

Use of externally compiled indexes

Indexes to selective parts of the world's patent literature are available from both official and commercial sources.

In addition to publishing journals giving details of newly issued patent applications or specifications, a number of patent offices publish or otherwise provide keys to their patents. These keys usually include an alphabetically arranged name index to assignees and a means for undertaking subject or class searches. The latter are in a variety of forms.

For example, the US Patent Office issues a subject index comprising lists of patent numbers relevant to each class in its classification. That of the French Patent Office is again in class order, the entries giving patent number, title and assignee. From the UK Patent Office, Group Allotment Indexes and classified sets of Abridgments are issued regularly and fifty year lists of patents falling within a specified class are compiled upon request.

Most of the well-known collections of abstracts include some coverage of the patent literature and the indexing of patents in these collections is as effective as that of the other types of document abstracted. Additionally, detailed indexes to patents relevant to the chemical industry are published by Derwent Publications Ltd, and Information for Industry, Inc.

A substantial number of indexes are available for manual search. A few are available for punched-card or computer searching. As the problems associated with manipulating large files are overcome, the number which can be interrogated by computers will increase. Services, such as INSPEC and *Chemical Abstracts Condensates*, which include a fair coverage of patents in the computerized data-base but which, because of present limitations, only lend themselves to providing for SDI requirements, will become usable for retrospective search.

With the resources which are now available it seems to me to be economic nonsense for information units to add to the amount of duplication already existing by indexing patents for themselves. Some people may well go further than this and query the need for local searching.

Commercial search services

Throughout the world agencies exist which will undertake searches of the patent literature on behalf of clients and which promise 'confidentiality'. Whilst I believe that strong cases can be made for the purchase of abstracts and of indexes, I am by no means so certain of the strength of the case for having searches undertaken by an external agency as a matter of routine. In times of pressure, yes. As a back-up to local efforts, yes. But as a routine matter, I think no.

The point that I have tried to make in this paper, and all of the arguments I have put forward and the methods I have outlined are in support of it, is that patents are, or should be, an integral part of the data-base from which relevant items are selected in the provision of both current awareness and retrieval services. That patent information and journal literature information may be given in separate bulletins issued on different days of the week does no harm. In fact the reader may well welcome having smaller, more digestible packages of information.

However, at search he may not welcome receiving the reply as two or more sets of references, which may be sent to him days, weeks or possibly months apart.

There is also the problem of ensuring that the search requirement is fully understood. The dialogue between the enquirer and the searcher preceding search is of vital importance and is not easily conducted by correspondence.

On the basis of local knowledge the information officer may well judge references to be relevant, which references would appear to the outsider to be irrelevant.

For these reasons I consider that searching is best undertaken by in-house effort whenever possible.

CONCLUSION

I hope that I have proved my twin theses: firstly, that patents are now comparable to the journal literature in importance as sources of technical information; and secondly, that unless users are provided with details of relevant patents in both current awareness and retrieval services, then they, the users, may well be incompletely informed about work going on in their fields. I further hope that the majority of those engaged in research and development are more appreciative of the value of patents than is the research man who as part of his reply to the question:

'Where and how do you draw the line between your literature searching and literature searching done for you by an information person?'

said:

'A search not important to me. Searches for patents on classes of compounds or specific compounds constitute the major type. I regard patents as being primarily legal, not scientific, documents and hence I have little scientific interest in them.'[5]

Unlike Bacon this gentleman cannot claim that 'I have taken all knowledge to be my province'.

REFERENCES

1 *Industrial Property*, December 1970, Annex.
2 *The British Patent System*. Report of the Committee to Examine the Patent System and Patent Law. Cmnd. 4407.
3 *Chemical Engineering News*, 12th July 1971, p. 39.
4 *Chemical Age* Survey, 30th July 1971.
5 *Journal of Chemical Documentation*, 11, 1971, p. 83.

Letter to the Editor

Dear Sir,

THESAURUS COMPILATION

Mr Peter Thomas, in his contribution on problems encountered in making a thesaurus of transportation and planning terms (*Aslib Proceedings*, November 1971), raises the question of whether nouns are best used in the singular or plural. He cites the nonsense that resulted when he tried to express 'Rape' as 'Rapes', and proceeds to justify the use of the singular according to its frequency of citation.

Thesaurus compilers should always bear in mind that they are expressing meanings and concepts, and that in many instances the meanings of words in the singular are different from those in the plural. To take Mr Thomas's examples: 'Murder' is a type of offence, but 'Murders' are instances of that offence; 'Forgery' is a type of offence, whereas 'Forgeries' are examples of the concrete results of the offence. These need distinguishing in a thesaurus, otherwise one is in danger of retrieving just that sort of misinformation that a thesaurus is designed to prevent.

To exemplify from another field, it is commonly observed that pathogens are synonymized with the diseases they induce, whereas those concepts demand strict separation. This becomes a little more obvious when a condition is the result of two or more factors acting in concert.

If a thesaurus compiler finds himself in need of rules as to when to use the singular and when the plural, I can think of no better statement than that given as Table No. 1 in *INIS*: *Guidelines for the development and maintenance of the INIS thesaurus* (IAEA-142; Vienna, 1971).

Yours faithfully,

D. LEATHERDALE

International Development Research
Centre (Ottawa, Canada),
c/o FAO Documentation Centre,
Rome, Italy.

25th February 1972

CURRENT AWARENESS LIST

Recent additions to the Aslib library catalogue are broken down into twelve broad groups, whose coverage is indicated below. These groups are not mutually exclusive but it is hoped that users will find them helpful in scanning for new items of interest.

User Studies
Analyses of information-seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory.

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject Organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies; reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies; directories.

JANET WALKLEY
Librarian

CURRENT AWARENESS LIST

*Items are available in the Aslib Library and may be borrowed unless marked * to indicate reference copies.*

User Studies

URQUHART, JOHN A. *and* SCHOFIELD, J. L.
Overlap of acquisitions in the University of London libraries: a study and a methodology.
Journal of Librarianship, vol.4, no.1, January 1972, p.32–47.
Analyses the orders from 49 of 59 University of London libraries.

KRAMER, JOSEPH
How to survive in industry: cost justifying library services.
Special Libraries, vol.62, no.11, November 1971, p.487–9.
A survey of use and consequent cost savings to the company of services provided by the Boeing Company Aerospace Group Library.

LIEBENOW, PETER
Deutsche Bibliotheksstatistik.
Zeitschrift für Bibliothekswesen und Bibliographie, vol.28, no.6, 1971, p.386–8.
German library statistics.

NEIL, A. G.
Library tutoring.
Education Libraries Bulletin, no.42, Autumn 1971, p.9–14.
Introducing students into library services.

CEJPEK, JIRÍ
k príprave uzivatelú odborných informací.
Ceskoslovenská Informatika, vol.13, no.12, 1971, p.21–30.
Education of users of special information.

Communication and Knowledge

HOLROYD, GILEON
On the sociology of knowledge.
Journal of Librarianship, vol.4, no.1, January 1972, p.48–56.
Two themes are developed: knowledge and power, and the social functions of knowledge.

OSINGA, M.
Wiskunde in bibliotheek en documentatie.
Open, vol.4, no.1, January 1972, p.11–16.
Mathematics in the library and in documentation: information theory.

MARSCHNER, ROBERT F.
Papers presented at ACS meetings.
Journal of Chemical Documentation, vol.11, no.4, November 1971, p.204–10.
Growth of, and variations in, the number of papers and registrants at national and non-national American Chemical Society meetings.

Information Processing Systems

STARKER, LEE N. *and others*
Multi-level retrieval systems: IV. Large systems.
Journal of Chemical Documentation, vol.11, no.4, November 1971, p.238–42.
The conversion of a Termatrex indexing system to a computerized system.

BREWER, J. G.
Algorithms in library instruction: a systems approach to information retrieval.
Libri, vol.21, no.4, 1971, p.328–35.

HÄRÖ, A. S.
Planning an information system for health services.
Methods of Information in Medicine, vol.11, no.1, January 1972, p.1–8.
Discusses the expert system, the traditional statistical system, the integrated problem-orientated system of databanks and the all-comprehensive databank.

RETRIEVAL SYSTEM AIDS MEXICAN MEDICAL CENTER
IMC Journal, no.16, 3rd quarter 1971, p.8.
Describes Microcode System at the Medical Center of the Mexican Institute of Social Security. (IMSS).

HUNTER, P. S.
A systematic method for the indexing and retrieval of patents using a faceted approach.
Journal of Chemical Documentation, vol.11 no.4, November 1971. p.221–4.
The Ever Ready Company's co-ordinate indexing system for patents on batteries, with details of the thesaurus used.

Language and Indexing

ICSU, ABSTRACTING BOARD
Proceedings of the full Board Meeting, July 1971, Orleans, France. [Paris]: the Board, [1971].
229p.

VIRGO, JULIE A.
The review article: its characteristics and problems.
The Library Quarterly, vol.41, no.4, October 1971, p.275–91.
Problems associated with the review literature in the sciences were examined.

Classification and Cataloguing

FILING
Office Equipment News, January 1972, p.36–49.

Space, access, retrieval and cost are the main consideration points.

Mechanization

FOERSTER, HEINZ VON
Technology: what will it mean to librarians?
Illinois Libraries, vol.63, no.9, November 1971, p.785–803.

HELAL, A. H.
Internationales Seminar über das Marc II -Format und den Austausch bibliographischer Daten in Maschinell lesbarer Form.
Zeitschrift fur Bibliothekswesen und Bibliographie, vol.28, no.6, 1971, p.403–7.
International seminar on the MARC II-Format and the exchange of bibliographical data in machine-readable form.

STOLTZENBURG, JOACHIM
Konnen grossere wissenschaftliche Bibliotheken den Computer für die eigene Sacherschliessung in absehbarer Zeit ausnutzen?
Zeitschrift fur Bibliothekswesen und Bibliographie, vol.28, no 6, 1971, p.373–7.
Use of computers for information retrieval in large science libraries.

KILGOUR, FREDERICK G. *and others*
Title-only entries retrieved by use of truncated search keys.
Journal of Library Automation, vol.4, no.4, December 1971, p.207–10.
Experiment testing utility of truncated search keys as inquiry terms in an on-line system.

LARC ASSOCIATION
LARC reports, volume 4, issue 4: system scope for library automation and generalized information storage and retrieval at Stanford University.
Tempe (Ariz.): the Association, 1971.
101p.
Describes the BALLOTS and SPIRES projects.

HELLER, STEPHEN R. *and others*
An experimental computerized CBAC research project, by Stephen R. Heller, Richard J. Feldmann and Kenneth P. Shapiro.
Journal of Chemical Documentation, vol.11, no.4, November 1971, p.248–51.
A literature searching system for CBAC with SDI and retrospective retrieval facilities.

CEDERGREN, R. J.
Computer-aided bibliographies for personal or group use.
Journal of Chemical Documentation, vol.11, no.4, November 1971, p.224–6.
A computer-aided bibliographic system used by a research group at Montreal University's Department of Biochemistry.

SCHIEBER, WILLIAM D. *and* THOMAS, GEORGE W.
An algorithm for compaction of alphanumeric data.
Journal of Library Automation, vol.4, no.4, December 1971, p.198–206.
Description of a technique for compressing data to be placed in computer auxiliary storage.

MALLEY, PATRICIA MUNSON
Development of a technical library to support computer systems evaluation.
Journal of Library Automation, vol.4, no.4, December 1971, p.173–84.
Development and growth of the United States Army, Computer Support and Evaluation Command (USACSEC) Technical Reference Library.

Subject Organization

DANIEL, CHANTAL
The center for information on historical research in France.
The Quarterly Journal, vol.28, no.4, October 1971, p.250–2.

KEMP, JULIET O.
The library of the Centre for Information on the Teaching of English.
Education Libraries Bulletin, no.42, Autumn 1971, p.20–4.
Describes functions and activities.

PHILLPOT, CLIVE
ARLIS: the Art Libraries Society.
Library Association Record, vol.74, no.1, January 1972, p.5–6.
Scope of Society's international links, details of membership.

TARAŞESCU, MIHAI
Informarea documentara in ramura metalurgiei.
Probleme de Informare si Documentare, vol.5, no.11, November 1971, p.670–4.
Information activities in the field of metallurgy.

LINFORD, J. E.
Books in English.
Library Association Record, vol.74, no.1, January 1972, p.9.
Description of a new publication to be issued in microfiche from 1972 by BNB.

HERSCHMAN, ARTHUR
Keeping up with what's going on in physics.
Physics Today, vol.24, no.11, November 1971, p.23–9.
Physicists' current awareness and how the American Institute of Physics tries to satisfy them.

CROMBIE, L
Specialist periodical reports of the Chemical Society (SPR): a major new development in the literature of chemistry.

Chemistry and Industry, no.40, October 2nd 1971, p.1122–4.
The Chemical Society's series of 36 annual or biennial reviews of chemical progress.

GRANITO, CHARLES E. *and* ROSENBERG, MURRAY D.
Chemical Substructure Index (CSI): a new research tool.
Journal of Chemical Documentation, vol. 11, no.4, November 1971, p.251–6.
A monthly index of permuted Wiswesser Line Notations covering new compounds reported in *Current Abstracts of Chemistry and Index Chemicus.*

BELTRAN, ALFRED A.
The craft of literature searching.
Sci-Tech News, vol. 25, no.4, Winter 1971, p.113–16.

Reprography

FITZHERBERT, LUKE
COM for the reprographer.
Reproduction, vol.9, no.1, January 1972, p.8–11.

SCHERTZ, MORRIS, *and* SHAVIT, DAVID
A new method of preparing a master card from the National Union Catalog.
Special Libraries, vol.62, no.11, November 1971, p.491–2.
Using Minolta copier to reproduce NUC entries.

Printing and Publishing

VAN HAGAN, CHARLES
The long and short of technical writing courses.
IEEE Transactions on Engineering Writing and Speech, vol.EWS–14, no.3, December 1971, p.68–75.
Comparative advantages and disadvantages of courses ranging from one-day lectures to one-year college courses.

BOLTZ, C. L.
Microbooks on microshelves.
Australian Library Journal, vol.20, no.11, December 1971, p.20–1.
Method developed by G. Davies for miniaturizing the printed book.

MONTAGNES, IAN
Scholarly monographs on microfiche: the University of Toronto Press as a case in point.
Microform Review, vol.1, no.1, January 1972, p.29–30.
First North American publisher to adapt the policy of publishing on microfiche and hard copy simultaneously.

GRAY, EDWARD
Microform concept: an innovative approach.
Microform Review, vol.1, no.1, January 1972, p.31–2.
Scientific and technical journals on microform.

TAYLOR, ROBERT S.
Libraries and micropublication.
Microform Review, vol.1, no.1, January 1972, p.25–7.
Changes in education; their effects on libraries; role of micro-publications.

FREITAS, DENIS DE
Reproductions for private use, and for educational library purposes.
Revue Internationale du Droit d'Auteur, vol.71, January 1972, p.31–57.

Administration and Management

LARC ASSOCIATION
LARC reports, volume 4, issue 2: a Library Acquisitions Information System (LAIS).
Tempe (Ariz.): the Association, 1971. 68p.

HAMILTON, ROBERT
Applying technology effectively in library operations.
Illinois Libraries, vol.53, no.9, November 1971, p.777–84.

ALLRED, JOHN
Data capture devices and stock control in libraries: some recent trends.
New Library World, vol.73, no.859, January 1972, p.189–91.

GUSHEE, DAVID E.
Factors affecting dissemination of chemical information.
Journal of Chemical Documentation, vol. 11, no.4, November 1971, p.201–4.
How economic restrictions are forcing librarians to reduce purchases of primary and secondary publications, and possible ways for marketers to respond.

SEWELL, PHILIP
Planning the college library of the future.
Education Libraries Bulletin, no.42, Autumn 1971, p.1–8.

ORNE, JERROLD
The renaissance of academic library building 1967–1971.
Library Journal, vol.96, no.21, 1st December 1971, p.3947–67.
A 5-year cumulation of statistics of university and 4-year college library construction.

STANFORD, EDWARD B.
British university library buildings.
Library Journal, vol. 96, no.22, 15th December 1971, p.4067–71.

BOCK, JOLEEN
Two-year academic library buildings.

Library Journal, vol.96, no.21, 1st December 1971, p.3986–9.
5 years of junior college and community college construction of libraries/learning resource centres/instructional media centres/ and learning skill centres.

LAKHANPAL, S. K.
A manual for recording serial publications in Kardex. Rev. ed. Saskatoon:
Saskatchewan University. Murray Memorial Library. Serials Department, 1971.
[iii], 42p.

LIBRARY ADVISORY COUNCIL (ENGLAND) *and* LIBRARY ADVISORY COUNCIL (WALES)
Public library service points: a report with some notes on staffing.
London: H.M.S.O., 1971.
11 270225 2
v, 23p.

ROTHENBERG, LESLIE BETH, *and others*
A job-task index for evaluating professional utilization in libraries.
Library Quarterly, vol.41, no.4, October 1971, p.320–8.
An index designed to measure the extent of a subject's involvement in 27 libraries related job tasks is reported.

DANESE, DENNY M.
Acquisition of U.S. patents pending.
Special Libraries, vol.62, no.11, November 1971, p.490–1.
Speeding acquisition of U.S. patents pending by applying for the priority documents upon which the corresponding foreign patent is based.

CARROLL, C. EDWARD
Some problems of microform utilization in large university collections.
Microform Review, vol.1, no.1, January, 1972, p.19–24.

PAWLIKOWSKI, NANCY J. *and* TUCKER, ROBERT G.
The untapped resource: unpublished manuscripts.
Journal of Chemical Documentation, vol.11, no.4, November 1971, p.215–17.
The treatment and use of a file of prepublication scientific materials, with data analysis.

MESTERHAZI-NAGY, MARTA
Rezolvari si tendinte in realizarea colectiilor din literatura de intreprindere.
Probleme de Informare si Documentare, vol.5, no.11, November 1971, p.651–9.
Organization of trade literature in Hungarian libraries.

GILBERT, LESLIE A. *and* WRIGHT, JAN W.
Non-book materials: their bibliographic control: a proposed computer system for the cataloguing of audio-visual materials in the United Kingdom.
London: National Council for Educational Technology, 1971.
900313-21-8 vii, 83p. (Working paper 6).

GOURLAY, J. W. GORDON
Clemson University circulation system.
The LARC Newsletter, vol.3, no.8, November 1971, p.2–3.
Describes total circulation system.

Library Systems

WORLD SCIENCE AND TECHNICAL INFORMATION SYSTEM
Unesco Chronicle, vol.27, no.12, December 1971, p.464–5.
Brief description of development and scope of UNISIST.

HAVLICEK, KAREL
Zásady svetového systému vedeckých informaci—UNISIST.
Ceskoslovenská Informatika, vol.13, no.12, 1971, p.6–10.
UNISIST—principles of a world system of scientific information.

HUMPHREYS, K. W.
The British Library.
Journal of Librarianship, vol.4, no.1, January 1972, p.1–12.
Describes the attempts made to determine the essential functions of a national library.

WOLFENDEN, SIR JOHN
The British Museum Library and its future.
In
BARNARD, T. D. F.
New directions in librarianship. 1971.
p.5–15.

HOOKWAY, D. T.
The Department of Education and Science and its relations with libraries.
In
BARNARD, T. D. F.
New directions in librarianship. 1971.
p.44–53.

HAIGH, P. A.
Conferences and their proceedings.
NLL Review, vol.2, no.1, January 1972, p.7–10.
How the NLL acquires and processes conference proceedings.

AINES, ANDREW A.
The United States Government and chemical information.
Journal of Chemcial Documentation, vol.11, no.4, November 1971. p.198–201.
Aspects of chemical information in the U.S. and developments needed to establish a national system.

MCBURNEY, R. E.
Technical information for industry.
FID Newsletter, no.2, December 1970, p.4–22.
Describes experiences in Canada.

STUMMVOLL, JOSEF
Die österreichische Dokumentationsbewegung seit 1958: Schicksal einergut gemeinten staatlichen Unterstutzungspolitik der technischen Dokumentation.
Biblos, vol.20, no.4, 1971. p.256–72.
Development of documentation in Austria since 1958.

IIAMS, THOMAS M.
National libraries of Latin Europe.
American Libraries, vol.2, no.10, November 1971, p.1081–5.
Includes the libraries of Paris, Rome, Vatican, Madrid, Lisbon.

CRACEA, P.
Indrumarea metodologica a retelei de informare documentara.
Probleme de Informare si Documentare, vol.5, no.11, November 1971, p.675–80.
Organization of information networks in Romania.

ASSOCIATION OF RESEARCH LIBRARIES. Meeting, 78th, Colorado Springs, 1971.
The university library in the seventies: minutes of the seventy-eighth meeting, May 14–15, 1971, Colorado Springs, Colorado. Washington, D.C.
The Association, 1971.
v, 118p.

DOUGHERTY, RICHARD M.
The unserved: academic library style.
American Libraries, vol.2, no.10, November 1971, p.1055–8.
Methods to improve academic library service.

URQUHART, D. J.
The future of inter-library lending.
In
BARNARD, T. D. F.
New directions in librarianship. 1971.
p.23–43.

CHAPMAN, J. C.
The quantity surveyor and LAMSAC.
Quantity Surveyor, vol.28, no.3, November/December 1971, p.55–6.

PASCHEK, CARL
Zur Damer der Literaturbeschaffung im auswartigen Leihverkehr.
Zeitschrift für Bibliothekswesen und Bibliographie, vol.28, no.6, 1971, p.388–90.
Assesses the time-factor involved in inter-library loans.

Professional Activity

BARNARD, T. D. F.
New directions in librarianship: papers read at the weekend conference of the London and Home Counties branch of the Library Association, held at Eastbourne, 30th April–2nd May, 1971.
London: Library Association. London and Home Counties Branch, 1971.
53p.

KLUTH, ROLF
Bibliothekwissenschaft in der Bunesrepublik Deutschland.
Libri, vol.21, no.4, 1971, p.369–73.
The concept of library science in the German Federal Republic and its present educational status.

WILKIE, LORNA C.
Directory of educational programs in information science, 1971–1972.
Washington, D.C.: American Society for Information Science, 1971.
0-87715-600-X vi, 105p.

ARMYTAGE, W. H. G.
The future of education and libraries.
In
BARNARD, T. D. F.
New directions in librarianship. 1971.
p.16–22.

EDWARDS, R. J.
Library school field work: a report.
Library Association Record, vol.74, no.1, January 1972, p.3–4.
Background and major recommendations of a report to the Education Committee on staff training in libraries.

SHARR, F. A.
The proper study of librarianship.
Library Journal, vol.96, no.20, 15th November 1971, p.3727–30.

CHICHERNEA, M., *and* GHERGU, N.
Instruirea si perfectionarea cadrelor din domeniul informarii documentare.
Probleme de Informare si Documentare, vol.5, no.11, November 1971, p.665–9.
Training of information staff.

CRITERIA FOR PROGRAMS TO PREPARE LIBRARY/MEDIA TECHNICAL ASSISTANTS.
American Libraries, vol.2, no.10, November 1971, p.1059–63.
Library Education Division (American Library Association) policy statement.

WYNAR, BOHDANS
Research methods in library science: a bibliographic guide with topical outlines.
Littleton (Colo.): Libraries Unlimited, 1971
87287 018 9
153p.; bibliog. (Research Studies in library science, 4.)

BATON, ANDREW J.
Research in librarianship in the USA.
Libri, vol.21, no.4, 1971, p.350–60.

MEMBERS' ADVERTISEMENTS

Acceptance of advertisements for publication in Proceedings *does not imply Aslib support for or endorsement of the goods or services advertised.*

Members' advertisement rates: first 15 words (minimum), 50p; 3p for each additional word. 10p if box number required. (No agency discount.) A separate section of these columns is available to non-members at £3 per S.C.I.

Translations services

MEDICAL AND HIGHLY SPECIALIZED SCIENTIFIC TRANSLATIONS. S.M. Bonnekamp, FIL, Member of the Translators' Guild (Med. Science & Lit.), 47 Firs Close, Muswell Hill, London N10. Tel. 01-883 3962 during office hours. After office hours an automatic telephone answering machine will record messages.

BUILDING AND CIVIL ENGINEERING TRANSLATIONS from Russian and German into English. G. L. Cairns, MIL, 19 Kingsley Place, London N6. Tel. 01-340 8990.

TECHNICAL SWEDISH, DANISH, NORWEGIAN translated by J. T. Craddock, B COM, FIL, Ekard, Ray Park Avenue, Maidenhead, Berks. Maidenhead 24931.

RUSSIAN/ENGLISH TRANSLATIONS. Twenty years' experience Government Department. Native Russian. A. de Merindol, 19 Ingelow House, Kensington, W8. 01-937 6788.

JAPANESE/ENGLISH RUSSIAN/ENGLISH translations. Chemistry, medicine, biology, zoology. D. A. Fraser, BA, MIL, 22 Gresley Road, London N19 3JZ. Tel: 01-272 5664.

WILFRED E. GOODAY, ARSM, DIC, C.ENG, MIMM, FIL. Member of Translators' Guild, Romanian and French. 161 Rivermead Court, London SW6. RENown 1912.

SCIENTIFIC TRANSLATIONS FROM JAPANESE, CHINESE, RUSSIAN, CZECH and East and West European languages into English and/or German. A. K. Henn, B SC, 'Glenside', Lower Leigh Rd., Pontnewynydd, Pontypool, Mon. Tel. Pontypool 3689 (after 6 p.m.).

MEDICAL, PHARMACEUTICAL, BIOLOGICAL translations from French, Romanian and Portuguese into English and from English into French and Romanian. Dr J. Jacobson, 94 Temple Fortune Lane, NW11. 01-455 1010.

TECHNICAL TRANSLATIONS from Russian, German and Polish into English. B. Klipstein, BSC(HONS), 1 Glenview Grove, Shipley, Yorkshire. Tel. Shipley 58215.

TECHNICAL AND COMMERCIAL translations from English into Russian. Mrs O. Linsley, 31 Parke Road, Barnes, London SW13. Tel. 01-748 8822.

TECHNICAL TRANSLATIONS from Japanese into English. R. A. Scutt, BA, 48 Somerset Avenue, West Wimbledon, London SW20. Tel. WIMbledon 1713 (01-946 1713).

TECHNICAL OR COMMERCIAL translations into/from English, German, Dutch and French. A. M. H. Speller, FIL, NGV, 6 Lakeside, West Ealing, London, W13 8HN. Tel. 01-998 1045.

AUTHORITATIVE TECHNICAL TRANSLATIONS. Spanish, French, Italian, German, Portuguese, camera copy or printed. E. W. Sykes, FIL, 39 West Close, Wembley, Middlesex, HA9 9PJ. Tel. 01-904 4273.

Advisory services

IRAS: A NEW ADVISORY SERVICE. As much or as little advice and assistance as you need—anything from a half-day's talk to a six-month's assignment. Miss Helen Townley, I.R. Advisory Services, 117 Wickham Chase, West Wickham, Kent, BR4 0BQ. 01-777 7560.

For sale

CHEMICAL ABSTRACTS, Vols 11–75 (1917–1971) bound, with indexes including Dicennial Index Vols 11–40 (1917–1946). Offers to Librarian, The General Electric Co. Ltd, Hirst Research Centre, East Lane, Wembley, Middlesex.

SUBSCRIBER TO *CHEMICAL ABSTRACTS* requiring only the even numbered issues (Inorganic Chemistry) would like to contact anyone interested in acquiring the alternate issues (Bio-Chemistry and Organic Chemistry) with a view to sharing the annual subscription. Offers to Librarian, Magnesium Elektron Limited, P.O. Box 6, Clifton Junction, Manchester M27 2LS. Tel. 061-794 2511.

Appointment vacant

AN ASSISTANT LIBRARIAN is required for the busy Central Information and Library Service of International Computers Limited at their Head Office in Putney. You would be responsible to the Librarian for the day to day running of the Library and for the supervision of four staff. You must have had experience in a commercial, management or possibly a public reference library and formal qualifications would be desirable. Salary is negotiable and highly competitive. Please write for an application form quoting ref. 130H to Mrs P. Roberts, International Computers Limited, 93/99 Upper Richmond Road, Putney, SW15. Or telephone 01-788 7272.

G. D. Searle & Co. Ltd.

Information Scientist

We are looking for a graduate to provide drug literature information for our medical department, to index documents and carry out literature searches.

Knowledge of information work is essential as is a degree in a relevant subject, e.g. Pharmacology or Physiology.

An attractive salary is offered, company benefits are above average and the position will be based at our new modern headquarters at High Wycombe.

Please apply to: **The Personnel Manager, G. D. Searle & Co. Ltd., Lane End Road, High Wycombe, Bucks. Telephone: High Wycombe 21124.**

SEARLE

Research in the Service of Mankind

Information Scientist

We need an information scientist to run a small technical library specialising in the telecommunications and data processing field.

In addition to the day-to-day running of the library, which covers the supervision of a library assistant, the selection and ordering of books, periodicals and standards, cataloguing etc., you will be responsible for the provision of an enquiry service and the preparation of an abstract bulletin.

Applicants should preferably be science or engineering graduates or hold a recognised qualification in information science. Previous experience of technical library and information work is essential.

Please write, quoting A3/71 and giving full career details to:
Manager, Personnel, ITT Creed, Hollingbury, Brighton BN1 8AL.

ITT creed

BBC requires

NEWS INFORMATION OFFICER

In its Reference and Registry Services Department

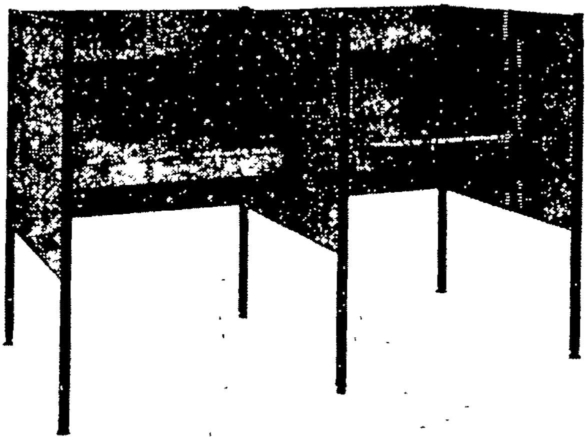
The News Information Service, with a staff of about 100, provides a quick and accurate information service to news and programme departments in Radio, Television and External Services. It is based on five separate Press Cuttings Libraries with a total stock of approximately 24 million cuttings and on two smaller servicing units. Main duties involve control and management of the service and responsibility for development of systems and techniques, including microcopying, concerning selection, reproduction and distribution of information on wide range of subjects.

Essential qualifications:— Wide knowledge of current affairs; ability to manage a widely dispersed Service working under considerable pressure and to maintain good relations with staff and users; good understanding of microfilming techniques. Professional qualifications as librarian or information scientist and experience at senior level in a press-cuttings library a distinct advantage.

Salary £2,853 p.a. (may be higher if qualifications exceptional) × £144 to £3,573 p.a. max.

Write or telephone now for application form (enclosing addressed foolscap envelope and quoting reference 72.G.127) to Appointments Department, BBC, London W1A 1AA. Tel. 01-580 4468 Ext 4619.

LIBRARY FURNITURE



No. 400 Study Carrel

Manufactured on a 'knock-down' system and can therefore be supplied with any number of positions. Can also be supplied double sided if required.

Catalogue of full range of Library Furniture on request.

B. Serota Ltd.

Contractors to H.M. Government and Municipal Authorities, Acme Works,
Rendlesham Road, Clapton, London E5 8PS. Tel. 01-985 1736/1787.

British Technology Index

CURRENT SUBJECT GUIDE TO BRITISH TECHNICAL JOURNALS

FOR TRACING AND RECALL

of $\left\{\begin{matrix}\text{specific}\\ \text{recent}\end{matrix}\right\}$ information

in the Field of Applied Science, Engineering and Manufacturing Technology

Monthly Parts and Annual Volume

THE LIBRARY ASSOCIATION

7 Ridgmount St. Store St. London, WC1 7AE

(Phone: 01-636 7543)

STOCK ADULT FICTION

Our new catalogue took months to prepare, and we hope it meets your requirements. The books are reinforced by sewing through the original publishers' cases, so adding greater strength to case and sewing. Then the original publishers' jackets are inserted in plastic sleeves.

If eventually this binding should break down then of course you can always send it to us for re-binding.

CEDRIC CHIVERS LTD
PORTWAY
BATH BA1 3NF **Tel. BATH 23201/3**

First for carpets
Dodson Bull

UP TO 30% DISCOUNT
BRANDED CARPETS

Wilton ● Axminster ● Oriental ● Tufted
● All makes available with full Manufacturers' Guarantees ● NO IMPERFECT GOODS SOLD ● Free delivery in U.K. ● Expert fitting service available most areas.

£200,000 carpets on display
in our extensive London and provincial showrooms
Write stating requirements or for introduction to carpet showrooms in most main cities. Free brochure on request to Dept. ALB

DODSON BULL CARPET CO. LTD
LONDON: 5 & 6, Old Bailey, EC4M 7ID. Tel: 01-248 7971. **BIRMINGHAM:** 164, Edmund St., B3 2HB. Tel: (021)236 5862. **BOURNEMOUTH:** 268, Old Christchurch Rd., BH1 1PH Tel: 21248. **BRISTOL:** 2-3, Royal London House, Queen Charlotte St., BS1 4EX. Tel: 28857. **LEEDS:** 12, Great George St., LS1 3DW Tel: 41451. **MANCHESTER:** 55-61, Lever St., M1 1DE. Tel: (061) 236 3687/8/9. **NEWCASTLE-upon-TYNE:** 90-92, Pilgrim St., NE1 6SG. Tel: 20321/21428. **WESTCLIFF-on-SEA:** 495, London Rd., SS0 9LG. Tel: Southend 46569.
Open: 9.00-5.30 Mon-Fri. Sat. 9.00-12.00
(Manchester 9.00-4.00)

AMERICAN DOCTORAL DISSERTATIONS
and
DISSERTATION ABSTRACTS
on
SCIENCES and ENGINEERING
NOW PRODUCED IN ENGLAND

For over 30 years our programme of American Doctoral Dissertations has benefited Scholars and Students. More than 150,000 titles are currently available. Thousands more are added annually.

Prices for Dissertations: Paperbound Xerography £5.00
Positive Microfilm £2.00
Annual Subscription to Dissertation Absracts International, Section B (Sciences and Engineering): 12 issues + cumulative index £36.55

Enquiries to:
UNIVERSITY MICROFILMS LIMITED
A XEROX COMPANY
TYLERS GREEN, HIGH WYCOMBE, BUCKS.
Telephone: Penn 3844 STD: 049-481 3844 Telex: 83536

Bibliographies are the librarians' primary aids . . .

LIBRARY ASSOCIATION BIBLIOGRAPHIES INCLUDE:

Bibliography of the dog. E. C. Jones.	£12 (£9.60 *to members*)
London theatres and music halls, 1850–1950. Diana Howard.	£4 (£3.20 *to members*)
Bibliography of nursing literature. A. M. C. Thompson.	£4 (£3.20 *to members*)
Bibliography of film librarianship. Sam Kula.	£1 (£0.80 *to members*)
Serial publications in the British parliamentary papers. Frank Rodgers.	£2 (£1.60 *to members*)
Steam locomotive development. Kevin Jones.	£2.25 (£1.80 *to members*)

Write for our Publications List to:

THE LIBRARY ASSOCIATION,
7 Ridgmount Street, London, W.C.1.

24 AUG 1972

A review of the literature on primary communications in science and technology

JACQUELINE HILLS

This review, prepared on behalf of the Office for Scientific and Technical Information, surveys some of the research that has been undertaken over the last twenty years on various topics relating to primary communications. For the purposes of this study primary communications were taken to range from the formal communication at a conference, through preliminary communications to formal publication of original research findings.

The text is divided into nine sections covering such topics as meetings, authors and editors (including standards and refereeing), economics of journal production, the subject fields of journals, preprints and separates, microforms, reading habits and information transfer, and the effects of primary communications on secondary services. Comments from a number of people concerned with the subject have also been incorporated.

551 references are listed in the bibliography.

Aslib Occasional Publication No. 9 ***£1.60***

SBN: 85142 039 7

Aslib Publications

Published in England by Aslib, 3 Belgrave Square, London SW1X 8PL
Printed by Alden & Mowbray Ltd at the Alden Press, Oxford

Aslib Proceedings

Aslib Proc. vol. 24 no. 5 pp. 263-313 London, May 1972

Claude Gill Books

a five star service to management

★ **Management and Training Centre**
A unique centre displaying over 10,000 titles on all aspects of management. Managers will find its comprehensive coverage meets all their needs.

★ **Mail Order Supply**
An efficient mail order section supplying books by post to customers throughout the world. Expert staff quickly trace current or out-of-print works, whatever the source.

★ **Worldwide Journal Subscriptions**
You can place a subscription with Claude Gill Subscriptions Ltd. for any journal, in any language, published anywhere in the world. Free renewal reminder service avoids interruption of supply.

H.M.S.O. ★ **Publications**
Government reports, bulletins and other publications available direct to visitors or mail order customers from a government publications department located within the Claude Gill showrooms.

'New Books' ★ **Bulletins**
Regular customers receive the monthly Claude Gill 'Management Newsletter' or 'Science Bulletin'. Listing and describing the most important new books and journals as they appear, these bulletins enable customers to keep up-to-date with latest developments. Simply write to us if you would like to receive these bulletins for a 3 month trial period.

Claude Gill Books
Management & Training Centre, 481 Oxford St., London W1R 2AQ

Aslib Proceedings

incorporating Aslib Information

VOLUME 24 MAY 1972 NUMBER 5

© 1972 Aslib and contributors

Aslib Proceedings: incorporating Aslib Information *is published monthly and supplied free to members of Aslib. Subscription rates are £10 annually to non-members, or £2.50 to Aslib members requiring additional copies. Single copies £1, or 25p to members.*

Further information about Aslib's services and membership rates will be supplied on application to the Director, Aslib, 3 Belgrave Square, London SW1X 8PL. Tel. 01-235 5050. Telex 23667; answer-back, Aslib London.

ASLIB CALENDAR 1972

June

TUE.6.	Biological Group AGM and lecture: 'Biological Abstracts Preview Project', by Miss M. Williams (Experimental Information Unit, Oxford). British Museum (Natural History), SW7. 2.15 p.m.
	Aslib R & D Department evening meeting: 'Computer-produced subject indexes', by Mrs Lucille Campey. Aslib. 5 for 5.30 p.m.
WED.14.	Aslib Annual General Meeting.
	Sixth Aslib Annual Lecture: Dr B. J. Mason, FRS (Director-General, Meteorological Office) on 'The World Weather Watch: a global system for the collection, communication and processing of weather information'. Royal Aeronautical Society, 4 Hamilton Place, W1.
FRI.16–SUN.18.	Electronics Group 14th Annual Conference. Civil Service Staff College, Ascot.
MON.19.	Co-ordinate Indexing Group meeting. Aslib. 3.30 p.m.
WED.21.	Aslib one-day symposium: 'Tomorrow's information worker—education and training.' Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1.

July

THU.6.	Aslib symposium (with BSI): 'UDC: revision or relegation'. Royal Aeronautical Society, 4 Hamilton Place, W1.
FRI.14–SUN.16.	Computer Information Group Conference, University of York.

September

SUN.24.–WED.27.	Aslib 46th Annual Conference, Ranmoor House, University of Sheffield.

October

WED. 18.	Aslib evening meeting: 'Electronic intelligent machines', by Igor Alexsander (University of Kent). Royal Institution of Nav Architects, 10 Upper Belgrave Street, SW1.
TUE. 31.	Transport and Planning Group/LA RSIS one-day conferenc 'Sources of information for leisure, recreation and tourism Library Association, 7 Ridgemount St, WC1.

November

TUE. 21.	Aslib one-day study conference: 'Management in a service contex 36 George Street, Manchester.

ASLIB INFORMATION

Aslib R & D meeting: computer-produced indexes

The speaker at the second in the series of evening meetings arranged by the Aslib Research and Development Department, to be held on Tuesday, 6th June, is Mrs Lucille Campey, B.SC, who will speak on 'Computer-produced subject indexes.'

The compilation of a printed subject index by computer program involves a series of inter-related human and automatic processes, with the balance between human and machine effort depending on the indexing techniques employed. A wide range of computer techniques have been devised for the purpose of producing subject indexes and a good deal of this work has been reported in the literature. However, in spite of the considerable activity in this field, very little information is available to the user regarding the application of these techniques in operational computer systems. In order to take full advantage of developments in this area and avoid unnecessary duplication of programming effort, the user requires details of available operational systems and some indication of the machine and human costs of using them.

Evidence of the need to study the application of computer facilities in this field has arisen from contacts between Aslib Research Department and various information centres. A project was initiated in February 1971 with two objectives: (i) to carry out a survey of computer techniques used in producing subject indexes and to collect details of available operational systems (with emphasis on UK systems) which are based on these techniques; and (ii) to study the extent to which human and machine costs of generating indexes are affected by the use of the various options provided by specific systems identified in (i). The first area of work is now nearing completion, with the results of the survey currently being documented for publication later this year in the *Aslib Occasional Publications* series.

Work in the second area, which is still in the initial planning stage, will involve an evaluation of machine and human costs of producing an index using a wide range of program and input/output options. The result of this second project should provide users with an indication of how certain index variables affect the costs of producing an index.

The meeting will be held at Aslib Headquarters and will begin at 5.30 p.m. (tea 5 p.m.).

UDC: revise or relegate?

As announced in the April issue, a half-day symposium is being organized by Aslib and the British Standards Institution to examine the recent proposal made by FID to draft a new Standard Reference Code (SRC) derived from the UDC. This will take place on Thursday, 6th July 1972, at the Royal Aeronautical Society, 4 Hamilton Place, London W1.

The purpose of the meeting is to provide an opportunity for users in the UK to hear, at first hand, an explanation of what is being proposed, to obtain some understanding of how the proposed changes may affect their own usage of UDC, and to put forward their own views of the merits or otherwise of the proposals. A number of experts in the field of classification have agreed to address the meeting, including A. C. Foskett (College of Librarianship, Wales), G. A. Lloyd (Head of Classification Department of FID and Secretary to FID/CCC), D. Newcombe (British Standards Institution), and J. Roland Smith (Chief of Library and Information Services, UKAEA, Risley).

The symposium will be chaired by Dr H. Coblans (Editor, *Journal of Documentation*). For further information contact the Meetings Organizer at Aslib.

Midlands Branch AGM

The 21st Annual General Meetings of the Aslib Midlands Branch was held on Thursday, 23rd March 1972 at the Engineering and Building Centre, Birmingham, and was attended by approximately fifty members and guests together with Mr L. Wilson, Director of Aslib. The elected Committee was as follows:

Chairman:	A. Nicholls (University of Birmingham)
Vice Chairman:	F. J. Goldie (Unilever)
Secretary:	A. T. Jones (BIP Chemicals)
Treasurer:	Mrs M. J. Pennells (Ergonomics Information Centre)
Members:	L. G. Birkett (British Leyland)
	J. Fletcher (Warwick University)
	Miss L. V. Green (Ashorne Hill College)
	R. Haynes (RAPRA)
	Mrs J. Pearson (GKN)
	A. D. Print (Rover)
	M. S. Robinson (MIRA)
	D. R. C. Whale (Tube Investments)
	D. P. Woodworth (School of Librarianship, Loughborough).

The meeting was followed by a buffet and social evening.

Electronics Group

The Aslib Electronics Group is holding its Annual Conference at the Civil Service College, Sunningdale Park, Ascot from 16th to 18th June this year. The programme includes papers on electronic video recording, fibre optic communication systems, the future of the technical bulletin, electronic aids in the library of the future, the Technology Reports Centre's services for industry, and a practical demonstration session. The College itself is situated in several acres of landscaped grounds and includes a swimming pool amongst its facilities. The fee is £13. Applications to Mr E. C. Goodliffe, Chief Librarian, British Aircraft Corporation, Stevenage, Herts.

Information and library services of developing countries

A survey is being carried out by the UK Representative to FID/Developing Countries Committee on ways in which organizations and individuals in the UK are attempting to aid developing countries build up their own information and library (documentation) services. This survey has the approval of both the

Aslib International Relations Committee and FID/DC. With regard to the latter it is hoped to obtain results suitable for discussion at meetings of the Committee in Budapest, September 1972, together, possibly, with results of similar surveys in other industrialized nations. Many of those most concerned have been, or will be written to, by the Representative. Anyone who has information relevant to this survey, and who has not been approached directly, is requested to inform Mr L. G. Patrick, College of Librarianship Wales, Llanbadarn Fawr, Aberystwyth, SY23 3AS. Any such information will be received most gratefully by him.

CIRA holds Committee of Enquiry

The Conference of Industrial Research Associations (CIRA) has initiated a Committee of Enquiry which will 'examine the scope, organization, functions and methods of operation of the Research Associations, including the relationship and interaction between themselves and with government, industry, universities and other bodies with the object of making suggestions to increase their industrial effectiveness'. The resulting report will be submitted to government and industry. It will be considered in the context of national research and development to enable a comprehensive viewpoint to be taken for strategy and policy in this field.

The Committee of Enquiry will be chaired by the Earl of Bessborough and will include The Lord Energlyn, Dr T. Emmerson, Dr F. E. Jones, MBE, FRS, and Sir Harry Melville, KCB, FRS.

For further information contact the CIRA office, 29 St James's Street, London SW1A 1HB (01-930 0820).

Dewey Decimal Classification, 18th edition, is published

The 18th edition of Dewey Decimal Classification, which was edited by the Library of Congress' Decimal Classification Division, has been published under a contract by Forest Press, Inc.

This new edition has a greatly expanded relative index which is more closely co-ordinated with the schedules, and contains more notes, definitions, and instructions to increase ease of use than its predecessors. There are 18,980 entries in the schedules and 7,161 in the auxiliary tables; schedules for law and mathematics have been completely revised, and there are numerous expansions, and five new auxiliary tables.

Other new features include the replacement of all former instructions to 'divide like' by simple-to-use instructions specifying exactly what digits should be added to what base numbers; the inclusion of 396 relocations (less than half as many as in Edition 17); a continuation of the process of reducing the Western emphasis; and provision for classifying any subject in extraterrestrial worlds, e.g., rocks on the moon, and later, if needed, social conditions in the planetary system of Arcturus.

The new edition is sold by Forest Press, Inc., 85 Watervliet Ave, Albany, NY 12206, USA, for $45 plus postage.

Institute of Physics publishes microfiche editions

In January this year the Institute of Physics started production of the *Journal of Physics Series* and *Physics in Medicine and Biology* in microfiche form, in addition to the current paper edition. Subscription rates for microfiches are the same as the UK rate for paper editions, and where a subscription is received to both paper and microfiche versions on the same order the Institute will give a 25 per cent discount on the combined subscription. All UK orders for microfiche editions should be sent to Physics Trust Publications, Blackhorse Road, Letchworth, Herts, and in the USA, Canada and Mexico, to the American Institute of Physics, 335 East 45th Street, New York, NY 10017, USA.

Science Policy

Science Policy Foundation, in collaboration with OECD, Paris, has recently begun publication of *Science Policy*, which is described as 'a world forum of information on science policy and organisation, technological innovation, environment conservation, government/industry relations and management philosophy'.

Published bi-monthly, *Science Policy* is a greatly enlarged and newly-designed version of the Foundation's former publication, *Science Policy News*, which has provided a valuable source of information for people concerned with the formulation and implementation of national and international science and technology policies. Besides articles on all aspects of science and technology policy, the journal contains an international digest of research news, book reviews and a list of current national publications.

The annual UK subscription to *Science Policy* is £6.40 for individuals and £8.40 for libraries. Orders should be sent to Science Policy, Inforlink Ltd, 2A Station Road, Frimley, Surrey.

Library Research Unit's 'management game'

The University of Lancaster's Library Research Unit has recently held a short course in Morecambe to demonstrate the potential use of a 'Library Management Game' as an educational aid for those administering libraries and information services. Such games have been used extensively in other fields (notably in business studies and military training); however it is believed that this was the first occasion on which the technique has been used in this way in librarianship.

The course centred on a computer simulation of part of a library system; participants, who included senior librarians from universities, polytechnics and industry, and a number of library school teachers, were given an imaginary 'library' with defined characteristics, and asked to improve its efficiency in terms of such measures of performance as the proportion of borrowers whose needs could be met immediately. Policy decisions made by the 'librarians' were input to a computer, which immediately predicted their likely results; the 'librarians' were then asked to prepare a five-year budget for their 'library committee', and to justify their proposed expenditure by the improved performance of the 'library'.

The feasibility study is being supported by OSTI and the Principal Investigator is Mr A. G. Mackenzie, University Librarian and Director of the Library Research Unit, from whom further details can be obtained.

Scottish Summer School 1972

The 36th Annual Summer School of Librarianship organized by the Scottish Library Association will be held at Newbattle Abbey College, Dalkeith, near Edinburgh, from 8th to 14th July 1972.

The 1972 syllabus includes contributions from over twenty specialists on a range of topics including The Future of Information Services, Local History Services, The Education Library Services, Management in Local Government, and Libraries, Literature and Social Conscience. The President of the Library Association and guest lecturers from related subject fields will also address the School, and Library visits and a coach tour are also included in the programme.

The cost of the School is £21. An illustrated syllabus is available from the Honorary Secretary, Scottish Summer School of Librarianship, Mr A. G. D. White, ALA, Blackhall Library, Hillhouse Road, Edinburgh EG4 5EG (031–336 3277) to whom all enquiries should be addressed.

West London College—Summer events

The Centre for Part-time Librarianship and Information Studies at West London College has arranged a number of events this summer which may be of interest to members. These include:

30 MAY. One-day course: 'Communication—information—librarianship'.
30 MAY–1 JUNE. Three-day course: 'Abstracting'.
5–9 JUNE. Five-day refresher course: LA Part One Examination.
MID-JULY. Fourteen-day course: 'Librarianship for overseas visitors'.
6–8 SEPT. Three-day Clinic: 'Foreign materials in libraries'.
LATE SEPT. One-day courses: 'Information and the community' and 'Psychology of enquiry'.

Further particulars about these events are obtainable from the Course Tutor in Librarianship, West London College, Centre for Part-time Librarianship and Information Studies, Greyhound Road, London W14. Tel. 01–385 5175.

Manpower research

In order to predict more easily the future demand for trained staff in libraries and information services, the Department of Education and Science has recently carried out a national census of the current stock of manpower, analysed by qualification, age group and sex, and of posts currently vacant. The results of the census will be analysed by computer, a summary will be published, and the statistical tables will be made available to interested research workers.

As a second step in their assessment of future manpower requirements, the DES has also commissioned a substantial research project on the staffing of public libraries to be conducted by the Local Authorities Management Services and Computer Committee (LAMSAC). The project will employ a number of librarians at different levels of seniority, and any librarian who would like to be involved in this project is invited to write to Max Broome, Library Adviser, Libraries Division, Department of Education and Science, 47 Parliament Street, London SW1A 2NQ.

Information science research studentships and fellowships

This year OSTI is offering a slightly increased number of research studentships (7) and fellowships (2) in information science. Science Research Council conditions continue to apply, but OSTI will now print its own handbook and forms and copies will be available through university and college departments to those interested in applying.

Aid to libraries in war-affected areas of Nigeria

As a result of the hostilities which took place in the former Eastern Nigeria, the library service there—a Unesco sponsored project and regarded as one of the best services in Africa—was brought to a complete standstill. Considerable efforts have been made since the war ended to reactivate the service and much has been achieved. All forms of aid are still very much needed, however, and the Nigerian Library Association has appealed for donations, either in cash, books or library materials for use in the area. Donations should be sent to the following libraries of your choice in the war-affected areas:

The Director, East Central State Library Services, Central Library, Enugu, Nigeria.

The Chief Librarian, South Eastern State Library Services, Calabar, Nigeria.

The Chief Librarian, Rivers State Library Services, Port Harcourt, Nigeria.

The Librarian, University of Nigeria, Nsukka, Nigeria.

Lectureships at the W. Australian Institute of Technology

The Department of Library Studies at the Western Australian Institute of Technology will shortly be requiring lecturers in the following fields: Systems analysis and data processing in relation to library operations; Physical bibliography and special materials; The social context of library services; School and children's librarianship.

General advertisements for these posts will probably not be appearing before July, but in the meantime the Head of the Department, John Dean, will be pleased to supply further information to any potential candidates. The address is: Western Australian Institute of Technology, Hayman Road, South Bentley, WA 6102.

People and places

MR ANTHONY J. LOVEDAY, MA, DIP. LIB., has been appointed the first full-time Secretary of the Standing Conference of National and University Libraries (SCONUL). Mr Loveday has been Librarian of the University of Zambia since its inception in 1965. He has also held posts at University College, London, University of Malaya, University of London Library, and Makerere University, Uganda.

MR M. GEOFFREY FORD has been appointed Assistant Director of the University of Lancaster Library Research Unit. Mr Ford was formerly Systems Analyst at Bristol University and has been working on the South West University Libraries Systems Co-operation Project. He succeeds MR MICHAEL K. BUCKLAND in this post, who has been appointed Assistant Director of Libraries (Technical Services) at Purdue University, Lafayette, Indiana, USA.

CBD Research Ltd and Verlag Dok.

CBD Research Ltd of Beckenham, Kent, have asked us to point out that they have no connection with the publications of Verlag Dokumentation Saur KG of Munich, and have cancelled the agreement to act as their agents in Great Britain.

BRIEF REVIEWS

ANDERSON, I. G. *ed.* Directory of European Associations. Part 1: National industrial, trade & professional associations. Associate Editor: G. P. Henderson. Beckenham (Kent): CBD Research; Detroit (Michigan): Gale Research, 1971. 406 pp. £12.00 ($30.00). (ISBN 0 900246 08 1)

The directory is arranged alphabetically by subject and the associations under each subject are sub-divided into countries. Details given in most entries include title of the organization in the original language and any authorized translation of the title, address, date of foundation, membership, activities, e.g. conferences, research, statistics and publications. The editors give a detailed introduction describing the coverage, limitations, sources and method of compilation of the directory and include the questionnaire which organizations were requested to complete.

This first volume of the *Directory of European Associations* includes almost 8,000 entries. Although restricted primarily to national industrial, trade and professional associations the scope of the directory has been set wide enough to include some learned societies whose interests are of particular concern to industry and commerce and the term 'professional' is interpreted in a broad sense. Agricultural and horticultural production organizations are listed as extensions of industrial production. Federations of trade unions appear, but not each union, and associations of chambers of commerce are included, but not individual chambers.

There are detailed subject indexes in English, French, and German and an index of the authorized abbreviations of the names and associations. In addition there is a complete alphabetical index of names of associations including authorized translations of names into other languages where such translations have been notified by the organizations concerned.

The compilation of a directory of European associations is a daunting task, and this is confirmed by the size of this first volume. It is proposed that the second volume will cover learned, scientific and research societies and a subsequent volume will include arts, sport, social welfare and other activities. This present volume is of the exceptionally high standard and comprehensiveness that one would expect from CBD Research Limited.

JUHASZ, S. and others, *compilers*. Cinderella—author index practices and philosophies. *AMR Report no. 54, 1971.* San Antonio (Texas): Applied Mechanics Reviews. Available as PB 198890 from US National Technical Information Service, Springfield, Virginia.

This report consists of replies to a detailed questionnaire on their author index practices, submitted by nineteen abstracting services for discussion at the 1971 annual meeting of the National Federation of Science Abstracting and Indexing Services. Each response is accompanied by sample indexes. The questionnaire covered layout, treatment of compound surnames, changed or variable surnames, given names, diacritical marks, filing, multiple authorship, authority lists, cumulation problems and other aspects. In diversity of practice in handling this indexing 'Cinderella' is apparent from the responses.

Although the compilers contribute a brief introductory discussion, the main value of the report is as a quarry of problems and examples of author indexing. This in itself is a useful contribution, for there is very little published study of this neglected area.

MALWAD, N. M. A selective bibliography on user needs for scientific and technical information. Trombay (India): Bhabha Atomic Research Centre, Library and Information Centre, 1972. 46 pp.

This selective bibliography containing 244 items gives an overall view of the literature, and not a critical view of the findings of various user studies.

A wide range of materials are included: periodicals, technical and government reports, books, comprehensive and selective bibliographies, conference proceedings, symposia and project reports on various aspects of the information needs of users in special libraries and information centres published from 1960 to August 1971.

The subject scope of the bibliography encompasses various procedures and methods employed in user studies; surveys, reviews of user studies, information gathering, formal and informal information channels and their effectiveness, together with a few studies on feed-back from users of computerized services. The user studies included mainly cover information requirements in pure and applied sciences, but a few major studies in the social sciences are also mentioned. Coverage is international with no particular bias.

Arrangement is alphabetical by author's name, supplemented by a subject index and report number index. Periodical abbreviations are the same as those in *Library and Information Science Abstracts*.

WEAST, ROBERT C. *ed.* Composite Index for CRC Handbooks. Cleveland (Ohio): Chemical Rubber Co., 1971. 339 pp. £25.50.

This publication is a computer-produced combined index to the ten Chemical Rubber Company Handbooks published prior to 1st September 1971. It is intended to publish a new edition annually, immediately after the new edition of *Handbook of Chemistry and Physics* is issued. In time the index entries for ten additional handbooks, at present in preparation, will be included. A word-by-word alphabetical arrangement with subheadings has been adopted, each entry being identified by a code symbol for the appropriate handbook, followed by the page reference.

The index unfortunately suffers from the common failings of wholly computerized compilation. Certain pitfalls to be avoided are pointed out by the publishers in their 'Suggestions for use': for example, on account of inconsistencies in indexing in the different handbooks it is necessary to scan *all* subheadings under any main subject heading. In a number of instances there are over a hundred such headings. Such indexing inconsistencies can also lead to a scattering of related headings in the main sequence: for example 'cross section' and 'cross-section' are separated by other 'cross-' terms. There are also unpredictable errors such as the siting of 'acetone' in the middle of various 'acetyl-' entries.

It is obvious that such a consolidated index has a great potential and even in its present state should prove useful to a wary user. Hopefully the publishers will attempt in future to produce a more uniform consolidated index, ideally by gradually making index entries in the different handbooks more consistent, as new editions are published. It would also be helpful if an indication could be given where identical information or tables are contained in more than one handbook.

WHO WAS WHO, 1961–1970. A companion to *Who's Who,* containing the biographies of those who died during the decade 1961–1970. London: A. & C. Black, 1972. 1243 pp. £6.50. (ISBN 0 7136 1202 9)

This sixth volume of biographies removed from *Who's Who* on account of death is welcome for several reasons, not least that it can replace ten volumes of *Who's Who* on the shelf.

Apart from the valuable information contained in the biographies themselves, *Who's Who* and its companion volumes contain an extremely useful index of abbreviations used in the text, a fact of which all users may not be aware. This volume will prove as invaluable as its predecessor to anyone who needs—either professionally or for purely personal reasons—biographical details of people who have died within the time-span covered.

The administration of diffuse collections

Wilfred Ashworth

Chief Librarian, Polytechnic of Central London

Paper presented at an Aslib Evening Meeting, 24th November 1971

THERE IS a story of the tourist who, after a special package tour intended to show the British way of life, complained that he had not been shown the Church of England! I meet much the same situation when people ask me to show them the Library of the Polytechnic of Central London for it has seven separate divisions dotted around its fourteen buildings and to show it all involves a walk of several miles. Perhaps this is why the Winter Meetings Committee decided to ask *me* when they thought it time that some attention was focused on the problem of administering diffuse collections. I have been a member of that Committee myself and can imagine the discussion. First the doubt—'but he hasn't been there very long', then the hopeful—'well at least he'll have had to *think* about it', and that's another meeting as good as fixed!

Many library systems have to operate a number of branches or service points at geographically-separated places. This has happened for a long time in municipal and county library systems where it is a natural consequence of attempting to provide a service within a reasonable distance of everyone in a widely-distributed population. Such a service parallels that offered by banks, multiple stores or large-scale dry cleaners, where loss of business ensues if there is no branch within easy reach. More recently, however, a new kind of multi-site situation has begun to develop in the library world. Industrial mergers have brought together separate companies which continue operations after re-organization and need to be supplied with information at scattered points. Universities in their growth have sometimes spread too widely to be served adequately at a single centre. Finally the polytechnics, formed by amalgamation of colleges, often widely separated, present the split-site problem in its most exaggerated form. It might be thought that the knowledge gained through years of experience of public and county branch systems could be drawn upon for help. Unfortunately it proves to be not entirely relevant. In the first place such libraries offer a homogeneous service which, considered in a rough and ready way, is not basically different if enough copies of each book needed to serve the population are either concentrated centrally or are spread out, like the population, into groups. In the second place the rate of growth of public libraries has been sufficiently slow to allow the development of an acceptable hierarchical system of administration. Neither of these factors is applicable to special libraries. As will be seen later both their state of flux and their primary concern with the advance of knowledge prove disruptive factors to the administration of a group of special libraries, and it is this type of library with which my talk mainly deals.

There used to be a subject called 'Library Organization' taught in Library Schools but it consisted largely of a set of rules culled from the experience of wise old librarians who had learnt them by trial and error. Lacking such guidelines, and hoping to avoid the error side of experiment, it seemed to me reasonable that we might, together, start by attempting to see whether any established principles of management offer useful pointers. For obvious reasons the most-studied type of organization has been the industrial manufacturing concern but in most cases emphasis on the interaction between people rather than on the firm itself makes the findings relevant to other systems.

However dogmatically they may end, in their introductory pages all textbooks of management seem to agree that there is no single set of principles or ideal system to which all administrative practice must conform, but rather a series of sets of rules which only succeed when applied to their own particular set of conditions. So the first task of management is to identify the nature of the organization and its set of conditions.

It does not require much consideration to identify the earlier type of multi-site library. Its established service—the loan of books for home reading, reference work, and extension activities to stimulate interest in books and library use—form a stable 'product'. The case is similar to that which Donald Schon, in his book *Beyond the stable state*,[1] recognizes as a centre–periphery style of organization. As stable examples he quotes the American Coca Cola company and the Roman Catholic Church. The former empire depends upon the sale of a product of secret composition for which licences are issued to approved retail outlets under strictly controlled conditions. In the second case the product is not for sale but is still under central control. For such organizations a bureaucratic administration is satisfactory, indeed desirable. The individual in the system has his precise function defined, together with his responsibilities and powers. By implication he is thus also told what is not his concern and what he must leave to the decision of higher authority. Such an organization, now usually called 'mechanistic', operates according to a consistent body of rules and has a strongly hierarchical framework which carries with it an inbuilt career structure. Promotion is according to seniority or achievement and is decided by superiors. There is never any doubt whether a particular appointment is promotion, demotion or a sideways move, since the status of each post is overt. It is interesting to see another similarity between public libraries and industries of this kind. The annals of the library profession are rich with legends about the great chief librarians of the past. These exactly parallel those which in industry gather about the personality of managing directors! Tom Burns and G. M. Stalker in *The management of innovation*[2] refer to a study of twenty organizations and say that the one constant element was the extraordinary importance ascribed to the heads of the concerns. Everyone interviewed referred to their 'outstanding personality', 'flair', 'wisdom' and even 'genius'. These estimates can persist in retrospect even when there could be no personal benefit associated with their expression, so they have to be taken as having some basis in genuine belief. In fact it is suggested that the existence of such beliefs is necessary to the success of the mechanistic organization and that the head fails if he does not inspire them. As a corollary, because he has a powerful influence over the destiny of his subordinates, he also has to endure social isolation and the loneliness of command. There is no reason why this form of administration should not persist in public libraries so long as there is no marked change in the service offered. Nor need it necessarily be affected by even major regrouping, as has been shown in the London Boroughs reorganization. However, it would seem that the bureaucratic approach has innate weaknesses where the product of an organization is subject to innovative change, which is the case in the newer multi-site libraries. They are all experimenting with systems, developing information services and introducing unfamiliar routines. Further, the information they provide is often on the frontiers of new knowledge in science, technology and the social sciences. All the prophets, McLuhan, Schon and Tofler have been at pains to point out that our society and many of its institutions subjected to the disruptive effect of the new technology are entering on a phase of continuous adaptation to the changes it brings. Schon, for example, traces the pattern of failure in a centre–periphery organization subject to innovative change. Instead of the centre issuing instructions to the outstations while they in turn report back directly in a manner creating a balance (as do the centrifugal and centripetal forces in a flywheel), the branches on the periphery start to make connections with each other without informing the centre. Instability develops and full control is lost. It is almost inevitable that this should happen in a changing situation where some of the outstations have a common problem not shared with the others. In an attempt to regularize what cannot easily be prevented a new organization system is drawn up. It remains a centre–periphery model but some, if not all, of the branches become secondary centres with partial autonomy, though there is still central oversight. In this state the functions of the primary centre become specialization in training, deployment, support monitoring and determination of overall policy. In such circumstances the customers of each secondary centre approach it as if it were autonomous and are dissatisfied whenever reference has to be made to headquarters. Thus centre–branch conflict arises with the familiar complaint of regional offices that headquarters is slow in decision, unresponsive to suggestion and out-of-touch with local conditions. The situation is readily recognizable when it occurs in libraries. For example, a local academic librarian can be faced with demands from a Board of Studies which conflict with total Library policy and an embarrassing division of loyalties ensues. If the secondary centres take independent action, the whole model fails. Schon sees the solution in the development of a network system of communications which formalize controlled interconnecting channels of authority, information or decision between the centres. The network differs from direct contact in that there are multiple interconnections or nodes in which several connecting strands meet. Such a network may have a powerful effect. Sometimes when a formal hierarchical organization becomes sluggish through overgrowth even an *informal* network superimposed on the system enables people to get things done.

It is doubtful, however, whether a network system alone is the answer to administrative problems in the diffuse library situation, though some network features may be of assistance. A more promising solution seems to be that offered by Burns and Stalker. They, too, recognize that in a changing situation the constant need to find answers to unfamiliar problems sets up an intolerable degree of strain in a mechanistic system of government. They examine the progress of breakdown in a different manner. Each difficult problem as it arises is sent higher and higher up the organization tree in the hope of finding a level where sufficient responsibility exists to settle it. Eventually executives lower down the scale claim that they can only resolve matters if they by-pass the senior managers and directly consult the head of the concern. When he becomes overloaded responsibility has to be delegated, so the organization chart is redrawn with stronger barriers against by-passing. As the situation usually recurs relief proves to be only temporary. Instead of this method a ruse which is sometimes tried is to pass unfamiliar problems over to a 'super-person': in other words a committee, though Burns and Stalker dub this device pathological!

The solution they propose, which has been found successful in changing industrial situations, is to move towards a newer form of management which is termed 'organic'. The mechanistic system has all the hierarchical controls and innate career structure we have already noted. It also has a rigid approach with clearly-differentiated functional tasks which sometimes leads to those tasks being performed as an end in themselves, rather than to accomplish the aims of the organization. The organic system is stated to be more appropriate to those changing conditions which give rise to unforeseen problems and call for action which cannot be dealt with automatically. The system seeks to develop a 'common culture', a manner of dealing with people and problems, and of making judgments which is the 'way' of the organization. Amongst the characteristics of the organic structure which seem especially relevant to a library situation are the following:

1. Special knowledge and experience are applied to the common aims of the concern.
2. Individual tasks are continually re-defined and adjusted through interaction with the staff.
3. Shedding of responsibility on to others is eliminated.
4. Commitment to the interests of the concern is not limited to the predefined narrow confines of one job.
5. The network structure of control, authority and communication.
6. Omniscience is no longer imputed to the head of the concern. Knowledge of the technical nature of any task may be located anywhere in the network, which point then becomes the *ad hoc* centre of control, authority and communication.

In respect of the network structure the organic system parallels Schon's advice, but he makes no provision for the building of a corporate approach to decision-making. However, good communication in an organic system is an important cohesive force. It takes place when necessary, irrespective of relative rank, and in the form of consultation rather than command. The content is therefore more often information and advice than instruction and decision.

While organic systems are not strongly hierarchical in the same sense as are mechanistic systems they can still be stratified, levels being differentiated according to seniority or expertise. It is assumed that the lead in joint decisions will be taken by the person who, on the occasion, shows himself most informed and capable. It is interesting to note that Burns and Stalker see that the simplest way of explaining the necessary commitment of individuals to their work is to describe it as of a 'professional' nature, which ties in with the nature of librarianship.

Having examined current management thought let us now try to see how it can be applied to diffuse library collections. Clearly I can do no more at this stage than identify pointers and lay down some general guidelines, but I hope this will prove useful. The first lesson would seem to be to reject a completely bureaucratic control. It is not, however, so easy to do this. In the inherited situation the 'Powers that Be' will expect that each major branch will be put in charge of a librarian or information officer with defined responsibilities and so the stage is already set for breakdown from all the causes we have seen. If Burns and Stalker are right such breakdown can be avoided if a sufficiently good interactive communication network can be set up and especially if a feeling of total involvement in a common professional purpose can be fostered. As a first stage in achieving this happy state it is advisable to isolate the unavoidable clerical routines, and, by making their performance as mechanical and as little time-consuming as possible, to remove them from the scene as creators of friction. In the interests of economy and interchangeability of staff, uniformity of routine must be aimed at, which requires common agreement. One can begin by setting up interbranch working parties to collect opinions and make recommendations on routine systems. These working parties should be composed of staff from different strata levels. The aim in this case is not to create a super-person in the form of a committee but to take the first step in encouraging working interaction. It also ensures that in several of the libraries there will be individuals who, as authors of the selected systems, have a vested interest in preventing erosion by local modification. Thus a network system has been started, which, later on, when experience of this form of interaction has been gained, can be applied to more fundamental matters like the design of new services and eventually to development planning. Of course a curb must be placed on the amount of time spent in round-the-table discussion. Instead in each case the most appropriate 'nodal' individual through whom interaction can continue must be identified as quickly as possible. If this method proves successful not only will a basic network have been created to bring coherence to the centre–periphery framework on which it has been imposed, but a 'style' of approaching situations will begin to permeate the library.

It is interesting to see that the role of the chief librarian is no longer to be omniscient but by his deep and extensive professional experience to be able to recognize the more critical factors in any situation. He will pilot his staff so that they become sensitive to potential snags in the solutions they choose to the problems they meet. It therefore is unimportant, as Tofler points out, when, because technical change is now so rapid, most managers have to administer staff more competent than themselves in some of the newer advances. In such matters a chief librarian may, without loss of standing, be merely part of a team examining a new development. It is his *way* of handling situations which determines the policy style of the library. He need in theory no longer be in social isolation as in a mechanistic organization, although it is extremely difficult in practice to develop an entirely free relationship, because all responses to him tend to be tinged with circumspection.

The total commitment of an individual within an organic system clearly makes more call on his resources, and may cause him to wonder exactly what is expected of him. To this there will be no detailed and specific answer in terms of a particular post, but Don Kennington, speaking to an Aslib Transport Group meeting a little over a year ago, suggested that the answer is apparent if one focuses on the contribution individuals can make to the results of the organization. 'In my experience', he said, 'good staff can be stretched and developed well beyond the limits which individuals would set for themselves.'[3] This, of course, is intensely rewarding both for them and for the organization to which they are responsible. The new organic approach suggests that in fact individuals can, in the right circumstances, be encouraged to stretch *themselves* and set their *own* 'reach for the stars' standards.

We must now leave the management side and concentrate for a time on the other aspects of administration mentioned in my synopsis. The one fact which unfortunately cannot be escaped is that it costs a great deal more to operate libraries on multiple sites. I refer, of course, particularly to the case where there are separate special libraries serving limited groups of users. In such a case any forced duplication of stock (for example, reference works which must be locally available, or duplicate copies required because there is an overlap of interests between two or more libraries) generally means wasted money. In consequence overlapping interests have to be considered most carefully. It must be decided whether to designate one of the libraries the centre for each particular interest or discipline, or to spread one's resources for that interest rather thinly between two or more libraries. There is no easy answer to the dilemma and it may not be feasible to make a uniform decision for all cases. Because the expense of unavoidable duplication will already be high most librarians will tend to favour the designation of the one most appropriate library as the centre for each particular discipline, notwithstanding the known unwillingness of users to travel far for the information they seek. However, special cases will undoubtedly have to be acknowledged where two different topics have to be studied at different places, each in conjunction with a common third topic. Legal, management or social aspects of problems form good examples of this kind. Unfortunately we in the polytechnic libraries are victims of the modern tendency towards the development of interdisciplinary degrees and diplomas which aggravates an already difficult situation. Possible relief lies in current suggestions for 'servicing' these interdisciplinary courses in the departments which are the centres of the particular disciplines. Thus students will already be working in different buildings at different times and therefore it is no hardship to them to use the appropriate libraries.

Another major factor in the increased expense of a multi-site library is the staffing problem. In the first place there is a minimum staff level needed to cover the hours of opening at even the smallest service point. In the second place each branch is in the condition of a small special library which lacks flexibility in staff usage and which cannot readily divide the duties to be performed into professional and non-professional categories. In order to assemble sufficient professional expertise at each separate location one is forced to appoint assistants at a generally higher professional level than would otherwise be justifiable. There are then too few juniors adequately to support their seniors and sometimes no staff at all of intermediate professional status. Interchangeability of members of staff between branches is also made difficult because they will have been chosen for particular libraries on the basis of specialist subject knowledge and if moved cannot be so effectively used. With each library falling into the 'small' category even a large system may still show all the disadvantages of smaller libraries, and be continuously vulnerable to overloading of the remaining staff during periods of illness, holidays and re-appointment following resignations. As the total staff number rises these effects diminish, but experience shows that until the staff level at each library reaches more than ten inefficient usage will remain significant.

Unfortunately no quantitative study has yet been made of the extra cost of multi-site libraries, though such a study is very much needed to support requests for funding them. It would be especially valuable if it could be carried out by an independent body for an organization such as the Department of Education and Science: the results would then carry some weight. Several librarians have made inspired guesses at their own supercosts but a great deal depends on their definition of what is a true extra. I am indebted to E. J. Ellis of the Polytechnic of North London for a suggestion that the figure for increased running costs is certainly not less than 5 per cent per site, that is to say, for two sites one would add 10 per cent, for three 15 per cent, and so on. This is a rough and ready figure but seems to tally with the estimates I, and some other polytechnic librarians, have been able to make. I have reason to believe that in an industrial situation the position would not be appreciably different. These estimates cover material and staff but not communications which depend too much on local conditions for any estimate to be generally applicable. Communication costs can be quite high as they include telephone charges, postages (internal and external), transport of books and periodicals and, often forgotten, a large item for unproductive staff-time and fares of staff members in inter-library movements. Part of this is chargeable at the highest level as the chief librarian and his deputy keep in touch with the branches and need to consult with major users of each library in order to monitor the local acceptability of the service. Another item not included in the above estimate of increased running costs is equipment, such as photocopiers, optical-coincidence punches and light boxes, and even typewriters and duplicating machines. They have to be made available at each centre though perhaps they may be under-utilized in consequence. The installation of a visible index system for recording periodicals, to take an example, can require the purchase of as many cabinets as there are libraries, with an increase in cost of several hundred per cent, a cost which becomes daunting even when written off over the notional life of the equipment. When, however, even more expensive equipment comes under consideration the cost may become not daunting but prohibitive. It is one thing to install electronic theft detection devices when one exit controls the whole collection, quite another matter if *x* black boxes have to be acquired and maintained. Yet the alternative may be an uncontrollably high rate of loss of material—a hidden aspect of the unfavourable economics of split-site operation. To go one stage further, suppose the matter under consideration is a computer issue system. Though it could well remove a load of finicky routine from the staff and offer a much improved service to users, the idea, at the present stage of technology, is out of the question, because of the cost of terminal equipment.

The unfavourable economics of carrying out routine processes at several separated locations naturally drives one towards consideration of centralization of matters like acquisition, mechanical processing of books, cataloguing and classification. But would this really be economical? The truth of the matter is that nobody knows. No investigation in depth has yet been made which would balance the costs of transport and communications against possible reductions resulting from better use of staff and equipment and potential savings through more experienced and bulk buying. Centralization of routines also leads to frequent enquiries from branch to centre and reduced effectiveness as seen by users who may have to be kept waiting for replies. It is hoped that if the Cambridge University Library Management Unit turns its attention, as expected, to Polytechnic Libraries the economics of central unit working will be one of the earliest problems to be investigated.

It might be thought from what has so far been said that diffuse collections are all debit and no credit, but that is not so. Again, there has been no study of the relation of size to effectiveness in libraries but there is little doubt that the larger libraries too easily become impersonal and make less appeal to users, even though their greater stock and wider range of resources are obvious advantages. Where information services are offered there is distinct advantage in having a workable number of users whose needs can become more effectively known through personal contact. Everyone familiar with the branch library situation knows how strong users' affinity to their own branch can be. This, of course, conflicts with the desire of the Chief Librarian to foster the image of the library as a unified service and provides yet one more problem to be resolved by compromise as both attitudes are in themselves meritorious. A decidedly positive advantage arising out of the community spirit in smaller, departmentally-based libraries is that library misuse, particularly losses by theft, can be significantly reduced by the social pressures which develop from a feeling of involvement and 'ownership'.

Another feature which often results from branch-loyalty is that the users of each branch may demand a local committee and wish to have some control over *their* library and especially over the way in which *their* share of the total library budget is spent. Public and county libraries are in a different position as their committee structure is imposed upon them by the nature of local government, so there is little point in commenting on them. However, in industrial, academic and other special libraries there can be little doubt that local committees are a mixed blessing. A single advisory committee can be useful in giving support to the librarian and in helping to determine general policy. It cannot be overstressed, however, that its function must be only advisory. It should have no powers over the administration of the library nor any control over professional work like, for example, book selection or budgeting. It is perhaps more acceptable that departments of the firm or organization should be asked to appoint liaison officers through whom (though not uniquely) departments' views and needs can be made known and to whom the local librarians can go for advice when necessary on matters of subject-interest. In this way users can be brought into a community relationship with the library to mutual advantage.

I hope this review will be regarded as an interim report on a subject of developing importance. Much more study is needed and far more evidence must be collected and collated before definitive administrative policies will emerge. In the meantime we who have the administration of diffuse collections can, paradoxically, regard ourselves as fortunate. A challenging job brings its own enjoyment and rewards.

REFERENCES

1 SCHON, DONALD. *Beyond the stable state.* London: Temple Smith, 1971.

2 BURNS, TOM *and* STALKER, G. M. *The management of innovation.* London: Tavistock, 1961.

3 KENNINGTON, DON. Managing effectively: some tips for special librarians. *Aslib Proceedings,* 23, 6, June 1971, p. 287–91.

DISCUSSION

MR M. H. WATERFALL (Pressed Steel Fisher Ltd): 'When a number of firms or organizations are amalgamated in a new group it does not necessarily mean that the information requirements of the parts change to any great extent. To attempt to unite the libraries under a central control may only increase operating costs without increasing effectiveness, particularly where the systems of classification and dissemination differ considerably. Closer and more conscious liaison between the existing information services may be all that is required.'

MR ASHWORTH: 'This is true in some cases, but it was usually the case that when two organizations merge, ideas are put forward aimed at reducing operating costs, for example by unifying the separate libraries that existed before the merger.'

MR A. J. DICKSON (Ealing Technical College): 'Has the speaker any plans for using telefacsimile, telex, or closed circuit television in his libraries?'

MR ASHWORTH: 'There are no plans at the moment for using these forms of communication, mainly because of the costs involved. With seven libraries in our system, we just could not afford to have telex units in each one; it is no good having one central telex, either, because of the time taken to deliver the message from one of the departmental libraries to the centre where the telex is installed.'

MR S. FRANCIS (Polytechnic of North London School of Librarianship): 'How does the figure of 5 per cent for extra costs relate to the figure of 25–33⅓ per cent for stock that the speaker quoted at the 1970 NUS Conference on Polytechnic Libraries?'

MR ASHWORTH: 'There is no difference here since this 5 per cent for extra costs applies to all seven libraries taken together, so the figure is then more than 30 per cent for stock overall.'

MR E. J. ELLIS (Polytechnic of North London School of Librarianship): 'In centralizing routine procedures in a scattered library service, how effective does the speaker consider the establishment of a central cataloguing processing and purchasing unit to be?'

MR ASHWORTH: 'I am still not sure if this would be a very economical move since those in the departmental libraries would have no easy access to the central cataloguing and processing unit, and there would be increased costs resulting from telephone calls and the use of extra staff time.'

MR G. A. BARNES (Procurement Executive, Ministry of Defence): In my former capacity as Chief Librarian of the Ministry of Technology I was responsible for four libraries in Central London and there were seventeen Establishment libraries which, although autonomous, had many common problems in librarianship and mutual co-operation which necessitated meetings and discussion with Headquarters staff. At an early stage it was decided to centralize the functions of book, report and periodical acquisition, cataloguing and classification and the internal distribution of some 3,000 separate periodical titles. I think that these functions are particularly suitable for co-ordination. The use of punched card methods for periodical records and punched tape with computer print-out for the main catalogue was satisfactorily adopted. Copies of this catalogue were distributed to the Establishment libraries. Additions were listed monthly and cumulated six-monthly and annually.'

MR H. C. CLAXTON (Burmah Castrol Company). 'The libraries within Mr Ashworth's Polytechnic, whilst diffuse, are nevertheless relatively adjacent to each other. When industrial mergers take place the libraries affected are often widely scattered. Can the speaker say whether the libraries of ICI or Shell, which are situated in different places throughout the country, do have any central control?'

MR ASHWORTH: Each Division is autonomous within ICI, so there is no central control over the different libraries. I do not know the situation in Shell.'

The Technical Indexes System for the control of trade literature

M. Ford

Technical Indexes Ltd

Paper presented at a meeting of the Aslib Midlands Branch, 12th October 1971

The problem of collecting product data

Despite a wealth of books on information handling, the problems and techniques associated with the handling of product data are sadly neglected by the standard works. In a way, this is surprising not only because these techniques are necessarily different from those used for scientific information, but also because, in the engineering industries, there is almost certainly a greater need for product data than for any other form of information. In another way, it is not surprising since the rules cannot be hard and fast, and the techniques will often have to be unscientific because of the number and variety of the sources of product data. Since the purpose of product data is not only to inform but also to sell, we cannot be surprised that there is a total lack of uniformity of size, shape, colour and layout in catalogues from different manufacturers. Standardization of these parameters would seem to be the initial answer to this problem, but, although there is a British Standard covering the subject and the Department of Trade and Industry has been urged to exert pressures on manufacturers, no standardization is ever likely to come into effect, or certainly not to any significant extent. A further ideal, that of a coding for literature, does not exist, contrary to popular belief. In addition to the practical difficulties created by these variables, there is the added problem that the user is unable to control his input of data, as he can with scientific information. Some manufacturers send their literature unasked and others do not send it even when asked.

There can be no doubt, however, of the need for product data, which may come to the user in many forms and via different routes. There are advertisements and editorial items in the technical journals, direct mail, exhibitions, sales catalogues and data sheets. Several surveys have been carried out on the form of product data most preferred by engineers in industry. Predictably the engineers have found that technical magazines, though useful for current awareness, are but rarely useful for information retrieval. The overwhelming majority of engineers and draughtsmen give as their main source of product data, the manufacturers' own catalogues and data sheets.

In many organizations the traditional method of storing product data is still employed: that is, an alphabetical file of manufacturers' catalogues and one or more of the standard buyer's guides as the sole form of index to the products. Generally, the librarian relies on published buyer's guides as the product index because he has neither the time nor, in many cases, the technical knowledge to index the contents of every manufacturer's catalogues. Nor has he the time to search for every relevant manufacturer and request the appropriate catalogues. Kept in the traditional fashion, neither the product information nor the mode of access is very satisfactory. The catalogues quickly become out of date because only a very small minority of suppliers are prepared and have the capability to revise product literature once it has been sent. For the vast majority of manufacturers there seems to be no such thing as an organized mailing list. The means of access to the catalogue collection is at fault, primarily because of its method of compilation. Most buyer's guides are compiled by a questionnaire technique. A list is produced, by the publisher, of all the products that he proposes to cover. This list is sent to companies thought to be supplying one or more of the products. The lists are returned by the companies with the items that they manufacture marked. The directory is compiled directly from these. We thus have a publication that has been compiled by many hundreds of individuals, each of whom has had different ideas as to the precise meanings of particular terms, and each of whom has an interest in promoting the sales of particular products. It is scarcely surprising then that the majority of directories compiled in this way, contain a multitude of omissions and wrong entries, and are of little value as a product index to a catalogue system.

The establishment of the Ti System

It was to try and improve this situation that Technical Indexes was established some eight years ago. We started from the premise that for a product data service to be commercially viable, it must be widely used. If it was to be widely used, then it must be inexpensive, since industry is not yet prepared to pay large sums nor, very often, even economic sums, for product data. This was our main reason for not starting with computers, microfilm, optical coincidence cards or other mechanized systems, although very effective product data systems could undoubtedly be provided by the use of such methods. We started with hard-copy systems and now operate these in three fields of technology, Chemical Engineering, Electronic Engineering and Components & Materials Engineering. Each system is a collection of manufacturers' catalogues and data sheets, housed in looseleaf binders, comprehensively classified and indexed. The index to each system is provided in the form of a Product Data Book that indicates which companies manufacture each product and shows where each company's literature is located in the system. The systems are rented to companies in the appropriate user industries. The systems are updated periodically by physically removing out-dated literature and adding new and replacement data. We employ uniformed young ladies for this task, each covering a different area of the country in her mini-van. Personal contact with the user is of utmost importance to gather feed-back for improving the system. The companies whose literature is included in the systems pay us for this service. This revenue subsidizes the cost to the user companies.

A hard-copy system of this type has a number of disadvantages. The more systems that are in operation, the more copies of his catalogues does the manufacturer have to supply; the more manufacturers that join the system, the more space the system takes up. The system can be degraded since catalogues can be removed or damaged, and a complete detailed check of every item of literature is prohibitively expensive. Finally, because some manufacturers will not pay for their literature to be included or cannot provide bulk supplies of their catalogues, such a system can never be comprehensive. We do, however partly overcome this as we have always listed and classified in our Product Data Books every manufacturer within the technologies that we aim to cover.

The use of microfilm

The use of microfilm overcomes the disadvantages of the hard-copy system. Only one copy of each catalogue is required from the manufacturer, thus cutting the cost to him, and also making a comprehensive system feasible. The space occupied is small, microfilm does not deteriorate in use, and, in cassette form has considerable file-integrity.

In addition, microfilm enables us to provide a comprehensive set of manufacturers' literature. In addition to the literature that manufacturers pay to have included in our microfilm system, which is the equivalent of the hard-copy version and is known as the Prime Source File, we can also supply, on film, the catalogues of those companies who are not prepared to pay. This additional literature is termed the Support File.

A user has the choice of taking the Prime Source File alone, which is still inexpensive because of the subsidy from manufacturers, or taking the comprehensive system which includes the unsubsidized Support File at a somewhat higher cost.

Despite the very large number of pages of information included in each system, the search time from obtaining the reference number from the Product Data Book to viewing the literature on film is very short because of the simplicity of design and operation.

We chose to use 16 mm roll film in preference to microfiche or aperture cards, because of the large volume of data that we had to include. Our three systems contain, between them, well over half a million pages of data. Viewing equipment for roll film has tended, however, to be expensive, particularly if it is cassette-loaded. We felt that cassette-loading was essential because we could not ask our users to spend their time threading film onto reel every time they wanted to look at a catalogue. Because of the high prices, partly due to the complexity of the equipment and partly because most of it is American-built, we decided to commission the design of our own microfilm reader. It marks a departure from conventional readers in that it has been designed from scratch to read not only cassette-loaded roll film, but also standard microfiche and 35 mm aperture cards. We ourselves are now filming our Prime Source product data at a reduction of 20:1 on single track. The Support File is filmed at 40:1 and thus we are able to put two tracks onto 16 mm film. This, coupled with recent improvements in film materials that enable 200 feet of film to be contained on a standard 3½ inch reel, means that our cassettes, which are of the pre-threaded double-reel type, contain 5000 frames for Prime Source and 20,000 frames for Support File. In addition, our users may employ the same machine to read any of the many thousands of microfiche available from such sources as the National Lending Library and the Technology Reports Centre, as well as their own internal drawings on aperture cards. The machine will also read the users' own

16 mm roll film for which we provide cassettes. A print-out attachment is in the design stage and will be introduced shortly.

Doing all the filming and processing ourselves has many advantages. We are able to keep a tight control on all aspects of the work. Monochrome reproduction of coloured originals, for instance, can create problems in readability, so we have adapted our cameras to film at varying illumination intensities for different combinations of colours.

The Prime File is filmed on a planetary camera, whereas the Support File is filmed on a flow camera. For the latter, the literature has to be in the form of individual sheets and this necessitates cutting every catalogue to suit. Furthermore, in both cases, every sheet has to be numbered to allow for referencing. The flow cameras have a page height restriction for filming but an infinite length capability, thus enabling charts and fold-outs to be readily handled.

We store the hard-copy master of all the literature filmed, divided by company. This is for our convenience but also follows naturally from the classification scheme—a matter which I will refer to again later on.

Acquisition of literature

Tracing sources of trade literature presents less of a problem than obtaining it or updating it. Many companies advertise, and thus can be found, in the technical periodicals. Others can be found from directories, the register of new companies, and, in our case, through our users. Of course, a few manufacturers produce no literature whatsoever. Makers of custom-built equipment are an example. In these cases, we ask for a letter from them giving details of the products that they manufacture.

Keeping a system up to date is a major problem. We, in fact, contact every manufacturer in the system regularly. We never assume that the initial set of literature received was complete. We are therefore compelled to tell each company exactly what literature we hold on its behalf. As we are dealing with over 10,000 companies I am sure you can imagine what a mammoth task this is.

The response from different industries varies considerably. Companies in the Electronic Industry are quick to reply and give a high percentage return. The Mechanical Engineering Industry is somewhat slower, with a less complete return that gives a need for a further request to be made. The Chemical Engineering Industry seems somewhat reluctant to send anything at all and, again, this poor response has to be followed up. All this indicates that the old-established engineering companies have a different outlook on the distribution of trade literature from the newer companies of the faster-changing industries. Electronics is still in its infancy and technological advances occur almost every week; this necessitates a better publicity organization to cope with the constant changes and new products.

As our product data systems cover all products readily available for purchase in the United Kingdom, we are also posed with the problem of handling a certain amount of foreign literature. An agent will almost invariably use its principals' catalogues to send to prospective customers. If these are printed in French, German, Japanese, or the like, they can, in themselves, create an embarrassment to the indexer. Translation is required to extract relevant information and their immediate use to a user might be questioned. However, for the system to remain completely comprehensive, they must be included.

Design of the System

I now propose to look at some of the principles and techniques for the classification and indexing of product information as employed at Technical Indexes. We established that a product data system has three quite different kinds of use. The first use comes from the designer who requires information on a particular product. He will wish to compare information from any company that makes the particular product.

The second is from the designer, or perhaps another engineer, who requires information about a particular product of a specific manufacturer. An example of this kind of use is the draughtsman who needs dimensions or other information to incorporate in a drawing.

Thirdly, there is the use made by purchasers who want information about companies, for example, in connection with alternative sources of supply. In designing the system to meet all three kinds of use, we also have to take into consideration the fact that the system will generally be located in a drawing office, a design office, or a purchasing department. Our system therefore has to be one that an engineer can use without the need to put his enquiry into a specified form, or without the aid of an information expert. We therefore use methods that are readily understood even by a casual user.

I have already pointed out the objection to the questionnaire method of compilation employed for buyer's guides. To obtain the necessary degree of consistency we recognize that the indexing and classification must be done by our own staff. We use the manufacturers' own catalogues and data sheets as the source of our information. At this point, we realized that it is no easy matter to determine just what a manufacturer actually produces even when the catalogue is available. Often a degree of technical expertise is required to recognize the equipment that is described. For this reason we employ engineers experienced in the technology with which they will deal, and we give them an instruction in the theory of classification that enables them to index the products satisfactorily.

Another reason for our choice of technically expert staff is that a manufacturer's literature is designed not only to inform but also to persuade. The indexer must therefore be sufficiently familiar with the products to enable him to identify the information that is of importance to a user and then to extract that information.

Another important decision was that the Product Data Books shall be available in unlimited quantities to each user company. The aim is to ensure that every engineer has his own copy. There are several benefits from this policy. Firstly, the engineer may find the information he wants is actually in the Book and thus has no need to consult the catalogue collection at all. He may also find that no relevant literature is contained in the system and thus avoid a wasted journey. He may also, in every case, perform a large part of his search without leaving his own desk. This is especially valuable when he wants to search for several manufacturers of the same product. Since the search can be carried out independently of the catalogue collection there is no delay or queue at the data source itself. This can be of great significance with a microfilm reader which can only be used by one engineer at a time. Finally, the wide distribution of the books promotes awareness of the system and encourages its use with a corresponding increase in the useful utilization of the engineer's time.

Classification scheme

It has been necessary in each technology that we have covered to establish our own classification scheme. In no case did we find that there was already in existence a system adequate for our purpose. Many systems do exist and undoubtedly provide a basis for the compilers. However, we have to deal with the requirements of a very large number of users and these requirements vary considerably. Ideally, we should use a system that enables the user to work through the parameters relevant to his product in whatever order of priority he establishes. Unfortunately, every product has so many parameters that this ideal cannot be attained. Indeed, even for the simplest product, there are more parameters than we are able to accommodate on a two-dimensional paper format. It would be possible, by going to coincidence cards, or some similar method, to adopt a co-ordinate classification system but this in itself would make the system unintelligible to the casual user. We have, therefore, had to adopt a classification system that is more easily understood and, therefore, usable by casual users and non-specialists. Basically, the system we employ is hierarchical but we have modified the classification to take account of many other factors. Indeed, our classification as it is now in use does not even require the user to recognize that it is hierarchical, since we provide a complete index to all the products at the beginning of the Product Data Book. In this index we incorporate synonyms for each product, so that it will not matter which particular name the user employs because he will always be led to the correct place in the Product Data Book for the information that he requires. We use, for the display of information, a chart format in which the products are listed along the top and the manufacturing companies are listed down the side. On each chart we bring together those products that perform a similar task, or have the same application irrespective of the method. We feel that this will be of use to a designer in offering him an alternative form of product of which he may not previously have been aware. In our product index we also list trade names, together with the product type and the manufacturer with whom they are registered. The advantage of this combined index is that the user who requires information on a product for which he only has the trade name (a classic example being 'Hoover' as against 'Domestic Vacuum Cleaner'), will have no difficulty in tracing the relevant information, since he will be drawing from a single index.

Our classification scheme is based upon a series of charts. Each chart is devoted to a group of products with a common factor. The parameters of the product are ranged across the top of the chart and the degree to which we break down the parameters is determined by a number of factors. Since our principal objective is to enable the user to locate a suitable product, but not to enforce any particular selection upon him, we have allowed the number of manufacturers that exists for a particular product to be a rough guide to the degree of classification that is necessary for that product. Our aim therefore is to split the parameters in such a way that the user will always find sufficient companies to select from, without having so many that he will be reluctant to go through the laborious task of looking at the literature of all of them. While we use this as a rough guide, we also take into consideration other factors that are peculiar to the product itself. For example, in dealing with metallic raw materials, we recognize that the user will be concerned with the processed form of the material, that is, ingot, bar, rod, section, etc. Our objective is always to aim between the two extremes of performing the selection for the user and providing so many companies that he is overwhelmed. In an area with few suppliers our classification will therefore be relatively shallow, whereas in a product group where there are many suppliers the detailed analysis will be correspondingly greater. We do not regard the classification as being fixed at any given stage. We recognize that industry changes and that its requirements will change. Thus we are always prepared to consider requests from our users for new products to be included and we ourselves, in any case, attempt to incorporate areas of product development wherever possible. Similarly, certain products outlive their usefulness and the manufacturers curtail their production. Correspondingly, we reduce the depth of classification for these products or withdraw them from the system altogether.

Classification grouping

Whilst there is no difficulty about assembling the product index since it will be in alphabetical order and since the reference from that index will lead to the appropriate chart, it follows that the order in which the charts are placed within the Product Data Book is not significant. However, for convenience the order of the charts is, with minor exceptions, that dictated by our initial hierarchical classification. In the case of the binder system it was natural that we should also place the literature into binders whose references followed closely upon those of the charts and, thus, the binder system is grouped by product. This grouping is particularly useful for a designer looking for information about a product to fulfil a particular function because he finds all the similar products, irrespective of their manufacturer, grouped together in one, or adjacent, binders. It is possible to make a case for grouping the product data by manufacturer. This is in fact the best method for those people who know the manufacturer that they wish to deal with. Whilst it is possible to use product grouping for the binder systems, there are several serious objections when one considers the microfilm system. In microfilm the user is not able to flick through the pages of a catalogue quickly and must rely on the index provided by the assembler of the system. We have come to the conclusion that, for this reason, the microfilm must be grouped by manufacturer. Other difficulties that could not be overcome satisfactorily include the tendency of manufacturers to produce one large catalogue covering all their products. In a product grouped system, such a catalogue would have to be split and the various pieces put into the appropriate places. Whilst this in itself is not too onerous a task, one is frequently confronted with pages on which two or even more different products occur. In such cases the page must be filmed two or more times in the appropriate locations. There is also the matter of the information in a catalogue that is common to all products, and by this we mean delivery terms, terms of payment, general price lists, guarantees, order forms and the like. This kind of information would either have to be filmed alongside every item of literature, or grouped together in a separate section of the microfilm divorced from the products themselves. However, all these objections could be surmounted, but there is one objection that so far has not been overcome and that is the greatly enhanced cost of updating a product based system. It is necessary to refilm a whole product group whenever new information becomes available about any product contained within the group. This means that a single alteration by any manufacturer necessitates such a refilming. Inevitably this means that the whole microfilm system must be refilmed in its entirety every time it is updated since there is no doubt that at least one manufacturer in each product group will provide some new or revised piece of literature. On the other hand, if the system is grouped by company, then only those companies that revise their literature need to be refilmed. We know from experience that in any six-month period only about 40 per cent or less of all manufacturers do revise their literature and, thus, only this amount of literature needs to be refilmed. We do not consider that the disadvantage of having to move from manufacturer to manufacturer when selecting a particular product is sufficient to outweigh the extra cost that comes from using a product group system.

Current situation

Technical Indexes is the only major product information retrieval company left in the three technologies that our systems cover. The Barbour Index operate a system similar to our hard-copy version, but in the architectural field, and there are one or two small companies in other fields. Other companies have tried in the engineering technologies but have failed. Three come readily to mind: Indata using computer cards, VSMF using roll film and also optical coincidence cards, and TIM using ultrafiche. The major fault with the Indata system was that they concentrated on new products, and completely ignored the existing ones. A system based on this type of awareness would take many years to become complete. The VSMF system was based on a product orientated layout. This made updating extremely difficult. The reader/printer that they supplied was sophisticated but very expensive. With the TIM system, all the product index was on film, which considerably restricted its use, whilst the product field covered was not directed at any particular technology other than the very general field of engineering. All three failed in their attempts to produce product information retrieval systems for the United Kingdom market and we, in fact, took over TIM after they had been operating for only one year.

Conclusion

The traditional catalogue collection formed by librarians has two main defects—(1) insufficient companies are included and (2) product indexing is inadequate. These both result from the fact that the librarian has neither the staff nor, in most cases, the technical expertise to carry out the work. As a result, many individual engineers attempt to establish their own private collection of catalogues and to rely on their memories for product indexing. Thus they confine their specifying ability to those companies whose range of products they have been able to memorize. The only solutions are to provide the librarian with adequate facilities—which would be prohibitively expensive—or to install a system like the one developed by Technical Indexes where the cost is spread over many hundreds of users.

Information services in university libraries

J. Hall

Sheffield University Library

ALTHOUGH information services in university libraries were suggested as far back as 1939,[1] it has only been since the mid-sixties that the information function has been seriously developed by university libraries in this country. Such developments have largely been confined to the technological universities and a few of their 'new' and 'redbrick' counterparts, but the case for them has been convincingly argued[2,3,4] and interest in the provision of information services has been general for some time, as was shown by the Report on Education and Training for Scientific and Technological Library and Information Work published by the Department of Education and Science in 1968.[5] In this Report twenty-six out of thirty-seven university librarians indicated that, resources permitting, they would like to extend the services offered to science and technology departments, with special library standards in mind. The rise of the computer-based services and the need to budget for their use may further accelerate the consideration of information provision in university circles and the coming Quinquennium seems likely to be of particular importance in the development of information services in universities. Some consideration of the implications and problems associated with them, especially for older universities, where staff are not used to such services, may therefore be useful at this time.

A study of the published literature and of annual reports of university libraries shows some of the main developments which have taken place. Organizationally, library based information services are provided by different types of staff in different institutions. The City, Surrey and Loughborough university libraries have created separate information sections, while in other technological university libraries, Bath and Bradford for example, services are provided by subject specialist information officers. This has also been the pattern in 'new' university libraries like Lancaster or East Anglia and at least one older library, that of University College, Aberystwyth, has organized some of its staff along these lines. Information services are also sometimes provided from departmental libraries; for example, the Town and Regional Planning Library at Sheffield and the Library of Electronic Engineering Science at University College, Bangor,[6] have developed information services in their subjects.

Belfast, Newcastle, Reading, Sheffield and Southampton university libraries have appointed information officers in broad subject fields, and similar appointments have been made by OSTI at Birmingham, Cardiff, Imperial College, Salford, Strathclyde and Sussex as part of a three year experiment to evaluate the role of information officers in promoting library resources and introducing new informaton services to library users. There were also experimental information officers at Durham as part of the PEBUL project[17] and at Bath in conjuction with the INFROSS survey,[8,9] while an experimental information service is currently being provided to medical scientists at Manchester University.

Information staff are usually responsible for instructing postgraduate and undergraduate students in the use of information sources, publicizing these sources through handouts and personal contacts and providing on the spot assistance with information problems. In universities where there are only one or two information officers, this work leaves them little time for more than informal current awareness activities and severely curtails the number and duration of retrospective searches. A number of libraries, however, are providing positive current awareness and retrospective services.

At the universities of Bradford, Belfast, Sheffield and East Anglia photocopies of the contents pages of relevant journals are sent to some of the academic staff. The library at the University of Aston produces a current awareness bulletin in Higher Education and similar bulletins are produced in Civil Engineering at Bradford and Mechanical Engineering and Human Sciences and Management at Surrey. On the other hand, the Information and Research Section at the City University Library emphasizes individual current awareness requirements rather than broader needs, and in 1968 was manually operating about a dozen personal Selective Dissemination of information (SID) profiles, while an individual SDI service is also being operated by the Library of the Department of Electronic Engineering Science at University College, Bangor.[6]

Manual retrospective searching tends to be curtailed by lack of time, but the annual reports of Bath, Bradford and Surrey university libraries, for instance, all announce significant searches carried out by their staff. In the City University the work of literature searching was divided between the library's information staff and the reader, with the former covering sources likely to produce material for several concurrent searches while the latter concentrated on his own specialist sources.[7]

The use of the computer-based services in universities has been limited for some time now by the introduction of charges and it has always been largely independent of the library. The OSTI financed Students Chemical Information Project, which gave five hundred final year research students free SDI from *Chemical Titles* tapes, found that university science librarians appeared to be too busy to undertake the work of liaison scientists.[10] MEDLARS is the only such service in which university library staff have played a significant role, and even with this service there is also a network of MEDLARS liaison officers dealing with users directly. However, many libraries will have made financial provision for the use of the computer-based services in their estimates for the coming Quinquennium; the role of library based information staff in the promotion of these services is one of the functions being investigated by the OSTI Information Officer project and a number of libraries have already taken the initiative in this respect.

Aston, Bath, Bradford and Sheffield have produced pamphlets describing the main services available, Bradford is producing current awareness services in Colour Chemistry and Heterogenous Catalysis from the *Chemical Titles* data base and a growing number of libraries are providing assistance in the compilation of profiles.

Attempts to cope with the information problems of university scientists are also being made outside the library and quite often unknown to it. Many research workers received, and some are still receiving, free printouts from the main computer-based services when they were in their experimental phase, or as a result of the work of the Experimental Information Unit at Oxford, while smaller numbers, usually only a few in each university, are paying for the services from their own funds.

Academic scientists often use their research assistants or technicians for literature searching and, partly as a result of the private information activities of university departments, a number of specialized information centres, such as the Biomedical Information Project at Sheffield or the Rock Mechanics Information Centre at Imperial College, have come into being, mostly with financial assistance from OSTI.

The Parry Report mentions the appointment of assistants in some departments to provide current awareness services[11] and there are signs that the number of information staff outside the library is increasing. In the last year, for instance, posts of information officer have been advertised by the Institute of Agricultural History at the University of Reading and the Department of Educational Research at the University of Lancaster, while in 1970 Aslib published a report on the establishment and operation of specialized information centres in which the author goes so far as to say that 'Scientists, particularly academic scientists, do not often exhibit a high regard for the services of librarians, so to encourage the use of a query-answering service the centre should present the image of being part of the scientific community rather than of the library world.'[12]

There are a number of serious implications in these developments. In 1968 the Advisory Committee on Scientific and Technical Information, speaking of information services in universities, said: 'It is difficult at present to state what this (the information function) should be, what kind of people can best do it, and where in the university it is best located—the library or one of the research departments.'[13] By and large this still seems to be the case. Studies like the INFROSS survey at Bath, the experimental operation of specialized information centres, the OSTI Information Officer project, and the evaluation of information services being carried out by the Experimental Information Unit at Oxford, will provide some of the answers, but much remains to be done. For example, the extent to which library based information staff can provide a service to pure scientists, which is quite crucial to the issue, still needs to be examined. Staff, therefore, are being appointed to provide information services on a regular basis at a time when very little is still known about the information needs of particular groups of university researchers and the most economic and efficient ways of satisfying them.

There are, however, common denominators to the information needs of scientists working in the same fields in different universities which suggest that expenditure on information services could be cut by providing them on a co-operative basis. Such co-operation has already taken place, for example, in the exchange of internally produced current awareness bulletins by Bradford and Surrey university libraries; but most information posts in universities are being created without co-ordination or overall planning and with the subsequent danger of an uneconomic deployment of manpower.

Information services are also developing in two diametrically opposite directions. Some are based in the library, others in the research departments. There often seems to be little understanding in one camp of the role that the other can play and whether they are provided by the library or the department seems to depend more on who takes the first initiative than on any objective criterion.

The parallel creation of library and departmental information staff is likely to ensure that the long standing rivalry between librarians and information scientists in industry will be carried over into the universities. More seriously, it could also result not only in a duplication of effort but in a possible duplication of personnel and confusion to the planners of library and information services.

Many university libraries have now been organized on subject lines and others have expressed the intention of doing so. This move towards subject specialization, although it preceded the growth of interest in information work, implied a new concept of service to readers and the two ideas are closely related. The provision of information services is commonly one of the duties of subject specialists and a few libraries have relieved their subject specialists of traditional routine entirely with this end in mind. The work of departmental information officers could seriously impinge on the actual or projected activities of these library staff and call into question some of the fundamentals of a system to which many libraries are now committed.

There seem, in fact, to be indications that information services in universities are developing in the same piecemeal and haphazard manner that has characterized so many library activities in the past and that the point has now been reached where universities singly, or preferably collectively, should recognize the information problem and establish some machinery to appraise the situation and to co-ordinate and give direction to the routine and experimental information services which are coming into being. OSTI does not appear to fulfil this function adequately since it is concerned primarily with the testing of ideas and not with the overall co-ordination of services nor with the routine deployment of non-experimental staff. An appropriate initiative in this could come, on the library side, from bodies ranging from the University, College and Research Section of the Library Association to SCONUL or the Library Subcommittee of the Committee of Vice-Chancellors and Principals.

There is also a need for frequent and continuing interaction between the information personnel themselves. Informal contacts between information staff in universities take place, especially through the periodic meetings resulting from the OSTI Information Officer experiment, but the numbers of people engaged in this work are increasing and more and more will find themselves doing in isolation what is essentially pioneering work. Some of these at least will be without previous experience of information activities or more than traditional library or scientific training. Regular meetings on a more formal basis, through conferences, symposia or seminars on topics specifically related to the information needs of universities, would enable information staff to hear of new developments, consider common problems and benefit from one another's experience. They would also give valuable guidelines to universities embarking on information services for the first time.

The existence of a co-ordinating body and regular contact between staff could go far towards establishing a co-operative approach to the provision of information services in universities. On the simplest level it would permit co-operation in the production of guides to information sources, but it could also facilitate, by a comparison, even on an informal level, of the needs of researchers in different universities, the identification of user publics in specific areas of research who could be served economically by a specialized information unit in a centre of excellence, by collaborative ventures like the exchange of current awareness bulletins, or by generating SDI from the magnetic tape versions of information services not yet available to university users in other than journal form. It could also consider the information needs of universities in the context of co-operation with the Polytechnics, other sectors of Higher Education and libraries and information services outside the educational network.

Universities will not spend money on services, the need for which is not fully recognized, at least at the levels where major expenditure is decided, and whose value is not yet proven. But they are moving towards a greater appreciation of the concept of cost-effectiveness, both in their administrative routines and their teaching methods, and information services are very much in line with this way of thinking. In a survey of the users of the computer-based services provided by the CAN/SDI system, for instance, 67 per cent of the respondents reported a saving in time of over two hours a week.[14] A recognized body concerned with the information needs of universities could promote consideration of the information problem by university administrators and bring the results of experimental services to their attention more effectively than is possible at present.

It will hardly be possible to finance controlled experiments in more than a few areas, but recognition of the information problem by universities, an overall appraisal of the situation, a definition of areas where research is necessary and co-ordination of the activities of existing information staff, with facilities for regular contact between them, could still provide a great deal of feedback on the best means of satisfying the information needs of university research, through the comparison of different methods of serving the information needs of defined user publics or experiment with new methods, even if this does not take place under controlled experimental conditions.

Such an approach to the information problem in universities should also help to clarify the respective roles of library and department based staff and to rationalize the creation of information posts within individual universities. This is an area where objective assessment is important and both possibilities should be investigated.

There are strong arguments for the creation of information staff in research departments. Such personnel would probably be specialists in the subjects concerned and could more easily gain the confidence of the research workers. There would be continuous interaction between the two and the information staff would probably come to understand their needs in detail. They would become 'our information officer' and be accepted as one of the team. It would probably be easier to attract qualified information staff to work in a university department than in the library and for a department to ask for a single information officer than for a library to ask for several.

On the other hand, all university libraries are already involved in the provision of information to a greater or lesser extent and, as has already been suggested, the library's positive role in this respect is becoming part of the new philosophy of university librarianship. Such a function is a logical development of existing library services and, wherever they are based, information personnel would have to depend heavily on the resources of the library, especially since the broad range of subjects taught in a university and the equally broad range of specialist research interests within a subject field make it difficult to envisage the effective use of the kind of retrieval systems associated with special libraries by other than specialized information units serving a user population in a number of different centres. The need for full time information personnel will also be greater in some subjects than in others and if staff were based in the library a more economic deployment of manpower might result.

University libraries like Bath and Surrey have already been organized to provide information services in depth and there is sufficient evidence, from the number of searches carried out by these libraries,[15,16] and from user reaction to SDI services as recorded in the reports on the Experimental Information Officer in the Social Sciences at Bath[8,9] and the PEBUL project at Durham,[17] that library based information services are feasible and acceptable to a growing number of university research workers. Therefore it seems most probable that, even if some departments find it convenient to appoint their own information personnel, most university libraries will have a positive role to play in the provision of information services to their readers.

It is also very much in the interest of university libraries to develop this function. Library staff are seldom fully equated with other academic staff in status, pay or facilities for research, nor have they ever been fully integrated into the teaching or research activities of the university. Circumstances are now providing them with a chance to rectify this situation.

University teaching in some fields appears to be moving, for reasons which are economic as much as educational, away from the lecture as the main instructional medium towards the seminar and the teaching machine. This seems likely to result in a greater independent use of the library and information sources by students and affords the library a chance to expand its teaching function accordingly. Similarly, university scientists have been overtaken by the information explosion and the way is open for the library to integrate itself more fully in the process of research by developing high level information activity to satisfy this new need.

Most university libraries have recognized their teaching function, but only a minority have actively promoted their role as an information centre and it might be gravely detrimental to the interests of librarians if information personnel were created in research departments, not because this was the best location for them, but to fulfil a need that could have been satisfied by the library. Not only would information activity pass out of their hands but they might also lose a substantial part of their teaching function, since the provision of information and instruction in the use of information sources are closely related.

However, there are some serious problems facing libraries which wish to promote information services, especially in the 'red brick' universities where the tradition of self-help among research workers is strongest. The most obvious is the span of disciplines involved, which means that in the present economic climate, and until the value of information services is proven and recognized, it seems most improbable that any university library will obtain the staff to provide the same level of service in a range of subjects that a single departmental information officer could in his own.

What libraries can and should do, if they do not wish to see the information function pass them by, is to ensure that at least some information services are provided, whether by their subject specialists or through the appointment of an information officer, thus establishing the library's role in this sphere of activity.

They may not have the staff to provide extensive manual SDI or retrospective search services but they can take the initiative in promoting the computer-based information services. In addition to budgeting for them in the 1972–77 Quinquennium they can ensure now, by building up files of information, producing explanatory pamphlets, inviting representatives from the services to talk about them and making sure that some of their staff are conversant with methods of profile construction, that they are the primary source of information and advice on these services in the university.

Another problem is that of obtaining staff with appropriate qualifications, particularly in science. There are few science graduates in university libraries and of these not all are engaged in information work. The Report on Education and Training for Scientific and Technological Library and Information Work[5] showed that in 1968 about 15 per cent of university library staff were scientists and from current university calendars it appears that most libraries have only one or two scientists and a substantial minority have none at all.

As information services develop the chances are that more scientists with information qualifications will be attracted to them and libraries may also benefit from the current shortage of jobs in industry for scientists in some disciplines, but at the present point in time there is little incentive for scientists to apply for posts in most university libraries.

So in the next few years, when the promotion of information services will have to be done, the work will often have to be in the hands of personnel who do not have a science degree or specialist qualifications in information work. One may justifiably wonder what chance they have of success.

Some subject knowledge is important in the interpretation of users' needs. Difficulties of interpretation can arise even among specialists. One of the interim reports on the Experimental Information Officer in the Social Sciences at Bath, for instance, describes conflicting interpretation of the term 'welfare economics' by an economist and a sociologist.[9] Subject knowledge is also important in the promotion of services. The characteristics of the liaison scientists who advised participants on the compilation of profiles for searching against *Chemical Titles* tapes in the Students Chemical Information Project are described as follows: 'acceptability to participants, including the ability to understand the problems found in research, to talk the same language as the student and to be respected by him on a professional level'.[10] If these are the criteria there seems little hope for non-scientist librarians and perhaps for some scientist librarians as well.

On the other hand, the liaison scientists themselves felt that, while a higher level of experience was useful in gaining the confidence of the students, it was probably not needed in the compilation of profiles and that what was most needed was skill in getting people to talk and describe their interest.

Arts graduates have been successfully assisting in the compilation of MEDLARS profiles for several years now and the experience at Bath University Library also indicates that subject training is not a paramount consideration. Its annual report for 1969/70 challenges the view that subject expertise rather than library qualifications is of greater importance in information work and states that: 'From our experience at Bath it would be wiser to say that motivation, personality and natural aptitude are the crucial factors in determining whether a person will make a good information officer.'

Thus there is evidence that arts graduates, given the will to familiarize themselves with the rudiments of a scientific discipline, can provide information services successfully. Some experimental assessment of the role they can play should certainly be undertaken, but, in the meantime, there are ways to ease the problem of non-specialists faced with the task of providing information services.

Libraries can ensure that their information staff have the time and funds to attend meetings and courses and visit established services in other libraries. The computer-based services could individually or jointly organize courses on profile construction aimed specifically at non-specialists and it is not inconceivable that basic instruction in science subjects could be given to arts graduates. OSTI has financed short crash courses in scientific Japanese at the Centre for Japanese Studies at Sheffield University and, if it is possible to devise a course like this, it should surely be possible to devise one aimed at giving non-scientists a grounding in a scientific discipline.

Related to the shortage of scientists in libraries is the problem of the confidence gap between academic scientists and the library. The Aslib survey of the use made of technical libraries showed that academic scientists were far less willing to delegate searching to librarians than scientists using other types of library[18] and the Report of the Students Chemical Information Project revealed that 52½ per cent of the final year research students involved had never asked a member of the library staff for help in tracing references, while 39½ per cent rarely did.[10]

There are probably various reasons for this—the tradition of self-help in universities or perhaps something essential to the nature of academic research, the fact that most librarians are known not to be scientists, that they always seem busy or that they are in some way off-putting people. But the most obvious reason must surely be that, until recently, libraries have never provided such a service or advertised their expertise in information retrieval.

User reaction to the library based information services which have already been provided is favourable, but nevertheless a confidence gap undoubtedly exists and some fundamental changes in the attitudes of librarians and the organization of libraries may be necessary if information services are to be promoted successfully.

There is often little interaction between librarians and other academic staff, and librarians, despite their apparent academic status, are seldom really regarded as an equal by their colleagues in teaching and research. They will have to break out of this rut by participating more actively in the affairs of the university and by ensuring that they are always deployed on work which is commensurate with their abilities. University research workers can hardly be expected to react favourably to offers of assistance and advice on how to find information or keep up with the literature of their subject from personnel who, until then, they have only seen filing issue vouchers, stamping out books or returning them to the shelves: and there are university libraries where graduate staff still regularly spend some of their time on these activities.

Other factors likely to affect a library's success in providing information services have been mentioned. An outgoing personality is an asset to anyone engaged in information work, the importance of regular informal contacts in ascertaining the information needs of researchers and updating current awareness profiles has been noted in both the PEBUL[17] and Bath[8,9] projects and it has been argued that the designation 'information officer' will help to break down the traditional suspicion of the library and convey that a new service is being offered.[3]

Another way of breaking down the physical and psychological barrier between library and teaching staff and acquiring some of the advantages of a departmental information officer is to base information staff in departmental libraries where these are large enough to make a service there viable. But organization on subject lines is probably the greatest asset of a library attempting to establish information services. The librarian/information officer will have contacts in the departments for which he is responsible, the research staff will know that he has some knowledge of their subject and he will be free to concentrate on the practical benefits of such a service.

This article has attempted to survey some of the developments in the provision of information services in universities, to suggest that these developments now require co-ordination and consideration at a high level if wasteful duplication of effort is not to occur, to argue the case for the library's continuing role in the provision of information services and to indicate some of the immediate problems facing librarians who wish to initiate them.

It may be that computer-based systems will some day make arguments about who does what irrelevant, but, if such systems are to be effectively utilized, the much greater sums of money involved, the need to ensure conformity and compatibility between them and to consider them in the context of a national information system, make long term planning by universities as a body all the more important.

REFERENCES

1 ASHWORTH, W. The information officer in the university library. *Library Association Record*, 41, 1939, p. 583–4.
2 LINE, M. B. University libraries—the information needs of the researcher. 1, A provider's view. *Aslib Proceedings*, 18, 1966, p. 178–84.
3 LINE, M. B. Information services in university libraries. *Journal of Librarianship*, 1, 1969, p. 211–24.
4 LINE, M. B. Information services in academic libraries. *In*: *Educating the library user.* Proceedings of the 4th Triennial Meeting of IATUL, 1970, p. B1–B10.
5 DEPARTMENT OF EDUCATION AND SCIENCE. *Education and training for scientific and technological library and information work*, by H. SCHUR *and* W. L. SAUNDERS. London: HMSO, 1968.
6 KING, G. P. Problems in a one man electronics library. *Library Association Record*, 73, April 1971, p. 70–1.
7 CORNEY, E. J. The information service in practice: an experiment at the City University Library. *Journal of Librarianship*, 1, 1969, p. 225–35.
8 BATH UNIVERSITY OF TECHNOLOGY. *Experimental Information Officer in the Social Sciences. Report of work carried out in 1969.* February 1970.
9 BATH UNIVERSITY OF TECHNOLOGY. *Experimental Information Officer in the Social Sciences. Report of work carried out in 1970.* January 1971.
10 OFFICE FOR SCIENTIFIC AND TECHNICAL INFORMATION. *Students Chemical Information Project.* Final Report: Part 1, February 1969. Part 2, June 1969.
11 UNIVERSITY GRANTS COMMITTEE. *Report of the Committee on Libraries.* London: HMSO, 1967.
12 MARTYN, J. *Notes on the operation of specialized information centres.* London: Aslib, 1971. Aslib Occasional Publication No. 5, p. 8.
13 ADVISORY COMMITTEE FOR SCIENTIFIC AND TECHNICAL INFORMATION. *The universities and scientific and technical information.* Circular letter to universities, February 1968.
14 WOLTERS, P. H. *and* BROWN, J. E. CAN/SDI System. User reaction to a computerized information retrieval system for Canadian scientists and technologists. *Canadian Library Journal*, 28, 1971, p. 20–23.
15 SURREY UNIVERSITY LIBRARY. *Annual Report 1969/70.*
16 BATH UNIVERSITY LIBRARY. *Annual Report 1969/70.*
17 UNIVERSITY OF DURHAM. *Project for evaluating the benefits from university libraries.* Final Report, October 1969. Chapter 7: 'A current awareness service for social scientists.'
18 SLATER, M. *and* FISHER, P. *Use made of technical libraries.* London: Aslib, 1969. Aslib Occasional Publication No. 2.

CURRENT AWARENESS LIST

Recent additions to the Aslib library catalogue are broken down into twelve broad groups, whose coverage is indicated below. These groups are not mutually exclusive but it is hoped that users will find them helpful in scanning for new items of interest.

User Studies
Analyses of information-seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory.

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject Organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies; reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies; directories.

JANET WALKLEY
Librarian

CURRENT AWARENESS LIST

Items are available in the Aslib Library and may be borrowed unless marked to indicate reference copies.*

User Studies

PROBLEME privind beneficiarii de informatii documentare.
Probleme de Informare si Documentare, vol.5, no.12, December 1971, p.722–38.
Users of documentary information.

HOUGHTON, BERNARD
Cut-back on periodicals.
New Library World, vol.73, no.860, February 1972, p.210.
Technique to estimate what the effect on users will be, if journal acquisitions are cut back by a given percentage.

HEWITT, JOE A.
Sample audit of cards from a university library catalog.
College and Research Libraries, vol.33, no.1, January 1972, p. 24–7.
Reviews results of studying a sample of cards (an audit) from a catalogue, indicates uses, and suggests perspectives for other audit operations.

MESTERHAZI-NAGY, MARTA
Instruirea studentilor din universitati si scoli superioare cu privire la biblioteconomia.
Probleme de Informare si Documentare, vol.5, no.12, December 1971, p.715–21.
Instruction of university and higher education students in the use of books and libraries.

Communication and Knowledge

SIMANDL, D , *and* KOFNOVETS, L.
Sovremennaya tematicheskay struktura mirovoi nauchnoi i tekhnicheskoi literaturii.
Nauchno-Tekhnicheskaya Informatsiya, Seriya 1, no.11, 1971, p.5–8.
Present structure of world scientific and technical literature.

SOMENZI, VITTORIO
Information and epistemology.
La Rivista dell'Informazione, vol.2, no.6, November/December 1971, p.80–3.

KNOX, WILLIAM T.
The pathology of information.
Technical Communications, vol.19, no.1, 1972, p.7–9.

SHANLEY, L. F.
Information for construction: some proposals for the management of information in the construction industry.
Management (Ireland), November 1971, p.23–6.
Analyses construction industry information flows and suggests ways of managing them.

CUBARLIN, O. S.
Librarianship in the system of the sciences.
Libri, vol.21, no.4, 1971, p.336–49.
How librarianship interrelates with the social, pure and applied sciences particularly in Eastern European countries.

INFORMATION et documentation dans le cadre de la formation permanente.
ANRT Information et Documentation, no.2, December 1971, p.9–13.
How scientific workers, particularly in innovation, keep up to date and informed on subjects outside their discipline.

OECD
Review of national scientific and technical information policy: Canada. Paris: the Organisation, 1971. 11 920 499 1
161p.

Information Processing Systems

SALTON, GERARD
The SMART retrieval system: experiments in automatic document processing.
Englewood Cliffs (N.J.): Prentice-Hall, 1971.
xix, 556p.

KAZAKOV, V. P., *and* SMOLIN, V. M.
Struktura i organizatsiya obozpimykh Kartorek.
Nauchno-Tekhnicheskaya Informatsiya, Seriya 1, no.12, 1971, p.20–3.
Structure and organization of new information storage and retrieval techniques.

MALININ, S. G.
Problemy optimizatsii otraslevoi informatsionnoi sistemyi (Na primere elektrotekhnicheskoi promyshlennosti).
Nauchno-Tekhnicheskaya Informatsiya, Seriya 1, no.12, 1971, p.12–6.
Specialised information system of the electrical engineering industry.

TILLMANNS, EMMA-JUNE H. *and others*
Atlas Biomedical Literature System: a computerized current awareness and information storage and retrieval system.
Journal of Chemical Documentation, vol.11, no.4, November 1971, p.242–8.
The ABLS system of Atlas Chemical

Industries Inc. producing a semi-monthly current awareness bulletin and allowing retrospective searching.

ROBREDO, J.
Minerve—un systeme mécanisé pour le traitement des informations en verrerie.
ANRT Information et Documentation, no.2, December 1971, p.19–30.
The MINERVE system for processing information at the French Institut du Verre.

BRISNER, ODD
ALLIANCE: et informasjonssystem: utvikling. *Tidskrift för Dokumentation*, vol.27, no.6, 1971, p.76–8.
ALLIANCE: an information system in the field of glass and ceramics.

GOOM, H. H.
SDI systems: a United Kingdom approach.
Special Libraries, vol.62, no.12, December 1971, p.535–8.
Describes the approach of GKN Group Technological Centre, Wolverhampton.

GALKIN, G. F.
Razrabotka systemy izbiratelynogo rasprostraneniya informatsii dlya nauchno-issledovatelyskovo, i prosktno-kenstruktorskova instituta.
Nauchno—Tekhnicheskaya Informatsiya, Seriya 1, no.11, 1971, p.14–16.
Development of an SDI service for an R & D and D & D institute.

TELL, BJÖRN, V.
SDI-tjansten och ett specialbibliothek.
Bibliotheksbladet, vol.57, no.1, 1972, p.12–3.
Effects of an SDI-system on the special library.

KIMLICKA, STEFAN
Model centra pre spracovanie informácií o ekonomickej literature na Slovensku.
Ceskoslovenská Informatika, vol.14, no.1, 1972, p.25–33.
Model of a centre for the processing of information on the economic literature in Slovakia.

RYZHOV, V. S.
Klassifikatsiya informatsionnykh sistem po tsoli ikh funktsionirovaniya.
Nauchno-Tekhnicheskaya Informatsiya II, no. 11, 1971, p.5–9.
Record-keeping, analytical, and decision making information systems.

Language and Indexing

YAMAMOTO, TAKEO *and* FUJIWARA, SHIZUO
Syntactical proximity: partial syntactical analysis of natural language data records.
Journal of Chemical Documentation, vol.11, no.4, November 1971, p.256–7.

UNESCO
Guidelines for establishment and development of multilingual scientific and technical thesauri for information retrieval.
Paris: Unesco, 1971.
iv, 20p. (SC/WS/501)

AVRAMESCU, AUREL
Analiza practică a frecventei descriptorilor.
Studi si Cercetări de Documentare, vol.13, no.4, December 1971, p.299–316.
The practical analysis of keyword frequency.

*COPPER DEVELOPMENT ASSOCIATION
Thesaurus of terms on copper technology. 5th ed.
New York: the Association, 1971. iii, 411p.
Prepared by Battelle Memorial Institute as part of the Copper Data Center program.

WINDSOR, DONALD A.
Frequency of titles containing DOPA-words in a complete collection of published documents on DOPA (3,4-Dihydroxyphenylalanine.)
Journal of Chemical Documentation, vol.11, no.4, November 1971, p.227–8.
Information content of titles of articles on DOPA as a measure of the effectiveness of title indexing.

FOSKETT, D. J.
A note on the concept of 'relevance'.
Information Storage and Retrieval, vol.8, no.2, April 1972, p.77–8.
Defines relevance in terms of the consensus of workers in a particular field and pertinence in terms of what the user knows.

BHATTACHARYYA, G.
Relative index and chain procedure.
Library Science with a Slant to Documentation, vol.8, no.4, December 1971, p.369–81.

RIEHL, M.
La collaboration autre les centres de documentation de l'Institut du Verre et de l'Institut de Céramique Francaise.
ANRT Information et Documentation, no.2, December 1971, p.16–8.
Co-operation in abstracting between the French Institut du Verre and the Institut de Céramique Francaise.

DOVGII, B. I.
Perenic slov i matematicheskaya logika.
Nauchno-Tekhnicheskaya Informatsiya, Seriya 2, no.12, 1971, p.15–24.
Automatic translation of text: word fractures and mathematical logic.

Classification and Cataloguing

MALTBY, ARTHUR
Classification in the 1970's: a discussion of

development and prospects for the major schemes.
London: Bingley, 1972.
269p.

MATTHIS, RAIMOND E. *and* TAYLOR, DESMOND
Adopting the Library of Congress classification system: a manual of methods and techniques for application or conversion.
New York, London: Bowker, 1971.
0-8352-0493-6
xi, 209p.

NEELAMEGHAN, A.
Search for a theoretical basis for UDC: a post-script to the Herag-Novi Symposium.
Library Science with a Slant to Documentation, vol.8, no.4, December 1971, p.303–22.

*STÁTNI ÚSTAV PRO ZDRAVOTNICKOU DOKUMENTACNI A KNIHOVNICKOU SLUZBU *and* STATNI LEKARSKA KNIHOVNA.
Universale Dezimale Klassifikation: Revisionsvorschlag: I: 59: zoologie: allgemeine und systematicshe Zoologie; 619; Veterinarmedizin: Index der tierischen Parasiten; Index der Tierkrankheiten. Prague: the Institute and Library, 1971.
[ii], 129p.

*STÁTNI ÚSTAV PRO ZDRAVOTNICKOU DOKUMENTACNI A KNIHOVNICKOU SLUZBU *and* STÁTNI LÉKARSKÁ KNIHOVNA.
Universale Dezimale Klassifikation: Revisionsvorschlag: II: 59: zoologia: animalium index alphabeticus trilinguis.
Prague: the Institute and Library, 1971.
189p.

*ENGLISH-TEACHING INFORMATION CENTRE
The ETIC classification. [London]. the Centre, 1971.
ii, 20p.

RANGANATHAN, S. R.
Library classification: fundamentals and procedure with 1008 graded examples and exercises: supplement, (by S. Dean).
London: North London Polytechnic. School of Librarianship, 1972.
[ii], 13p.

SEETHARAMA, S.
Human disease: depth classification version of CC.
Library Science with a Slant to Documentation, vol.8, no.4, December 1971, p. 335–68.

GUPTA, B. S. S.
Application of two-way merge technique for arranging variable length class numbers consisting of alpha-numeric and special characters.
Library Science with a Slant to Documentation, vol.8, no.4, December 1971, p.382–4.

TAUBER, MAURICE F. *and* FEINBERG, HILDA
Book catalogs.
Metuchen (N.J.): Scarecrow Press, 1971.
0 8108 0372 0
572p.; bibliog.

GELLER, EVELYN
A media troika and MARC.
Library Journal, vol.97, no.2, 15th January 1972, p.249–53.
Progress report on audio-visual cataloguing standards and services.

Mechanization

WARHEIT, I. A.
The automation of libraries: some economic considerations.
Special Libraries, vol.63, no.1, January 1972, p.1–7.

COMPUTERIZED INFORMATION SERVICE.
American Libraries, vol.3, no.1, January 1972, p.79–80.
Projects supported by the National Science Foundation Office of Science Information Service.

HERMANN, WALTER
STAIRS: ein Programmsystem fur die maschinelle Dokumentation.
Nachrichten fur Dokumentation, vol.23, no.1, February 1972, p.12–6.
STAIRS—new software for computerized documentation.

NANCE, RICHARD E., WICKHAM, W. KENNETH, *and* DUGGAN, MARYANN
A computer system for effective management of a medical library network.
Journal of Library Automation, vol.4, no.4, December 1971, p.213–20.
TRIPS (TALON Reporting and Information Processing System): an interactive software system for generating reports to NLM on regional medical library network activity.

KOCH, KARL-HEINZ
Die Maschinengängigkeit der Dezimalklassifikation.
Libri, vol.21, no.1–5, 1971, p.226–33.
Application of computers to UDC.

LONG, PHILIP L. *and* KILGOUR, FREDERICK G.
Name-title entry retrieval from a MARC file.
Journal of Library Automation, vol.4, no.4, December 1971, p.211–12.
A test of validity of earlier findings on 3,3 search-key retrieval from an in-process file for retrieval from a MARC file.

WILKINSON, W. A., *and* STOCK, LORETTA A.
Machine-assisted serials control: binding

preparation and claims control.
Special Libraries, vol.62, no.12, December 1971, p.529–34.

LINGENBERG, WALTER
Ausleihverbuchung mit Hilfe eines Computers: allgemeine Fragen.
Libri, vol.21, no.1–3, 1971, p.246–61.
Computerized loans procedures.

PALMER, FOSTER M.
Automatic processing of personal names for filing.
Journal of Library Automation, vol.4, no.4, December 1971, p.185–97.
Method for preparing personal names already in machine readable form for processing by standard computer sort program.

NEGUS, A. E. *and* HALL, J. L.
Towards an effective on-line reference retrieval system. Abingdon, (Berks.): UKAEA. Culham Laboratory, 1971. [ii], 39p. (CLM-LM 2/71).
Describes Culham's RIOT System.

YAMAMOTO, TAKEO *and others*
Todai Scientific information Retrieval (TSIR-1). 1. Generation updating and listing of a scientific literature data base by conversational input.
Journal of Chemical Documentation, vol.11, no.4, November 1971, p.228–31.

Subject Organization

SPECIAL libraries in the USSR: an analysis of soviet studies.
International Library Review, vol.4, no.1, January 1972, p.83–95.
Public libraries, technical libraries, medical libraries, agricultural libraries, academic libraries.

GULYA, JÁNOSNÉ
A belkereskedelmi kutato intézet tájékoztatási tovékenységének kialakilása, fejlodése és feladatai.
Tudományos és Muszaki Tájékoztatás, vol.18, no.11–12, November–December 1971, p.865–71.
Background, development and scope of information activities in the Institute of Home Trade Research.

MARSHALL, HELEN
The Institute of Psychiatry Library. *Library Association Medical Section Bulletin*, no.88, February 1972, p.5–7.

ANDREWS, JOHN S.
The Central Library of the Nuclear Research Establishment Julich.
International Library Review, vol.4, no.1, January 1972, p.71–81.
Library building, documentation and information services.

WALTER, P. L.
Information Centre profile: the Brain Information Service (BIS).
Information, vol.3, no.6, Nov.–Dec. 1971, p.330–3.

RUOKONEN, KYLLIKKI
Finski Handelshögskolans Bibliotek som informationscentrun i ekonomisk documentation.
Tidskrift för Dokumentation, vol.27, no.6, 1971, p.74–5.
The library at the Helsinki School of Economics and Business Administration as an Information Centre for Economic Documentation.

DUISENGALIEV, T. K., GAVRILENKO, A. B., *and* MUKHAMEDZHANOV, U. S.
Spravochno-informatsionnoe obsluzhivanie i propaganda peredovogo opyta v organizatsitakh i na predpriyatiyakh ministerstva geologii kazakhskoi SSR.
Nauchno-Tekhnicheskaya Informatsiya, Seriya 1, no.11, 1971, p.17–18.
Reference information service at the Ministry of Geology of Karzakhstan.

DANNATT, R. J.
OSTI and DHSS and medical libraries.
Library Association Medical Section Bulletin, no.87, November 1971, p.9–14.

KIVIAHO, ALLAN
Litteraturtjansten och biblioteket vid Oy Stromberg AB.
Tidskrift för Dokumentation, vol.27, no.6, 1971, p.69–74.
Library and information services of a Finnish electrochemical manufacturing company.

PATRINOSTRO, FRANK S.
The Library Automation, Research and Consulting Association (LARC).
Information: News, Sources, Profiles, vol.4, no.1, Jan.–Feb., 1972. p.61–4.
Describes history, purpose, present activities and plans of LARC.

SURRENCY, ERWIN C.
New directions for law libraries: alternatives for the future.
Law Library Journal, vol.64, no.4, November 1971, p.507–21.
Panel discussion.

BIRD, VIOLA A.
Reader services in law libraries.
Law Library Journal, vol.64, no.4, November 1971, p.486–506.
Panel discussion.

BOWDEN, CHARLES, L., *and* BOWDEN, VIRGINIA M.
A survey of information sources used by psychiatrists.
Bulletin of the Medical Library Association, vol.59, no.4, October 1971, p.602–8.
Results of questionnaires sent to 400 randomly selected members of the American Psychiatric Association.

THUSS, JOACHIM
Literatur dokumentation des Biomedical Engineering.
Nachrichten für Dokumentation, vol.23, no.1, February 1972, p.22–6.
Literature documentation in the field of biomedical engineering.

TOMAS, L. A., *and* GNUCHEVA, V. V.
Sopostavitelynyi analiz vtorichnykh istochnikov informatsii (referativno-bibliograficheskoikh) po farmakologii i toksikologii
Nauchno-Tekhnicheskaya Informatsiya, Seriya 1, no.11, 1971, p.19–23.
Comparative analysis of secondary information sources in pharmacology and toxicology.

SHAW, RENATA V.
Picture searching. 1: Techniques.
Special Libraries, vol.62, no.12, December 1971, p.524–8.
Picture searching is discussed as a special intellectual discipline for which no specific education or established requirements exist at present.

SHAW, RENATA V.
Picture searching: 2: Tools
Special Libraries, vol.63, no.1, January 1972, p.13–24.
Tools with which a picture researcher must be familiar in order to adequately search for various types of pictures are described.

Reprography

FACSIMILE transmission
Australian Special Library News, vol.5, no.1, January 1972, p.1–7.
Reviews progress and problems in libraries' use of facsimile transmission with special reference to its use in Pennsylvania State University and Bay Area Reference Center (BARC).

Printing and Publishing

BABBIDGE, IRENE
Beginning in bookselling. Rev. ed. London: Deutsch, 1972. 0–233–96019–8
95p.

KASER, DAVID
The United States book industry abroad, *Library Trends*, vol.20, no.3, January 1972, p.500–5.

KAMINSTEIN, ABRAHAM L.
Conference for revision of the Universal Copyright Convention.
Copyright Bulletin, vol.5, no.4, 1971, p.3–33.
Report of the general rapporteur.

TOURNIER, JEAN-LOUP
Droit d'auteur et redevances en matière de vidiogrammes.
Revue Internationale du Droit d'Auter, vol.71, January 1972, p.5–29.
Author's rights and claims in respect of audio-visual materials.

Administration and Management

BRODMAN, ESTELLE
The pursuit of excellence.
Bulletin of the Medical Library Association, vol.59, no.4, October 1971, p.549–54.
An attempt is made to define excellence and then to apply that definition to some of the problems facing medical librarianship today.

SUMMERS, WILLIAM
A change in budgeting thinking.
American Libraries, vol.2, no.11, December 1971, p.1174–80.
Various budgeting techniques.

HORN, ROGER
Think big: the evolution of bureaucracy.
College and Research Libraries, vol.33, no.1, January 1972, p.13–17.
Points out the danger of choosing a wrong organizational model in university library management.

WOLFE, J. N. *and others*
The economics of technical information systems: a study in cost-effectiveness, by J. N. Wolfe, D. Brydon, A. Scott, R. Young and associates: information consultant: T. M. Aitchison. Edinburgh: Edinburgh University, (1971?)
3v. OSTI Report no.5103.

SCHWUCHOW, W.
In welchem Umfange ist die Wirtschaftlichkeit von Dokumentationseinrichtungen messbar?
Nachrichten fur Dokumentation, vol.23, no.1, February 1972, p.7–11.
To what extent can the economic efficiency of documentation services be measured?

KINGSBURY, M. E.
Plan by increments.
Library Journal, vol.97, no.3, 1 February 1972, p.465–7.
The importance of planning in library administration.

VOLOVIK, Z. YA., KUKLYA, G. E., *and* OSTANIN, A. M.
Opyt setevogo planirovaniya nauchno-informatsionnykh rabot v nii.
Nauchno-Tekhnicheskaya Informatsiya, Seriya 1, no.11, 1971, p.11–13.
Network planning of research and information work at an R & D institute.

SCHÜTZSACK, U.
Managing problems and costs in setting up a mechanized information system: International Food Information Service IFIS.
Nachrichten fur Dokumentation, vol.23, no.1, February 1972, p.17–21.

HOEY, P. O'N.
Information/library statistics as a management aid: a graphic presentation.
Special Libraries, vol.63, no.1, January, 1972, p.8–12.
Graphic treatment of simple statistics to help evaluate library and information functions.

SCHICK, FRANK
International library statistics programs.
American Libraries, vol.3, no.1, January 1972, p.73–5.
Advances in the last 6 years.

WRIGHT, GORDON H.
Purchasing for libraries: advantages and complexities of the CAATs' co-operative approach.
Canadian University and College, vol.7, no.1, January/February 1972, p.23–6.
Describes procedures at the College Bibliocentre, Don Mills, Ontario.

DILLEHAY, BETTE
Book budget allocation subjective or objective approach.
Special Libraries, vol.62, no.12, December 1971, p.509–14.
Budgetary control and financial management as keys to efficient utilization of resource invested in industrial libraries.

JENKS, GEORGE M.
Book selection: an approach for small and medium-sized libraries.
College and Research Libraries, vol.33, no.1, January 1972, p.28–30.
Description of the process of current and retrospective book selection in a medium sized library.

VOLLERS, HEINRICH
Die Besoldungsstruktur im wissenschaftlichen Bibliothekswesen.
DFW Dokumentation, Information, vol.20, no.2, January/February 1972, p.51–4.
Salary structure in scientific libraries.

BLETON, JEAN
International symposium on the construction of university libraries.
Unesco Bulletin for Libraries, vol.26, no.1, January–February 1972, p.33–6.
Symposium held at Lausanne, Switzerland, from 29th June to 2nd July, 1971.

BARRY, JAMES W.
New Medical library buildings: III. The Library of Science and Medicine, Rutgers —The State University of New Jersey.
Bulletin of the Medical Library Association, vol.59, no.4, October 1971, p.574–8.
A new free-standing library building, designed to integrate the collections serving interdisciplinary study in science and medicine, is described.

HODSON, J. H.
The administration of archives. Oxford: Pergamon, 1972. 08–016676–8 iv, 217, bibliog. (International series of monographs in library and information science, vol.15).

BRADFORD, SUSAN
New media: new methods.
Catalogue & Index, no.24, Winter 1971, p.3–5. Characteristics of non-book media; types of collections and catalogues.

RACHOW, LOUIS A.
Care and preservation of theatre library materials.
Special Libraries, vol.63, no.1, January 1972, p.25–30.
Housing and collection of clippings, photographs, playbills program etc.

Library Systems

INTERGOVERNMENTAL CONFERENCE FOR THE ESTABLISHMENT OF A WORLD SCIENCE/INFORMATION SYSTEM, Paris, 1971.
UNISIST: Intergovernmental conference for the establishment of a world science information system: Paris, 4th–8th October 1971; final report. Paris: Unesco, 1971. 60p.

BAKER, F. W. G.
World science and technological information system: intergovernmental conference for the establishment of a world science information system.
ICSU Bulletin, no.25, December 1971, p.18–22.

AMBARTSUMIAN, V. A.
I. Scientific information and the International Council of Scientific Unions.
ICSU Bulletin, no.25, December 1971, p.3–9.

FAVRE, M. C.
Conférence intergouvernementale, pour l'établissement d'un systèm mondial d'information scientifique UNISIST tenue à la Maison de l'UNESCO à Paris, du 4 au 9 Octobre 1971.
Nachrichten–Nouvelles–Notizie, vol.48, no.1, 1972, p.24–8.
The aims of UNISIST and Switzerland's willingness to co-operate in the system.

STANFORD, EDWARD
Looking to the future in Great Britain.
American Libraries, vol.3, no.2, February 1972, p.157–62.
Library and information science in U.K.

HARRISON, KENNETH
American libraries through British eyes.
American Libraries, vol.3, no.2, February 1972, p.163–9.

TOTOK, WILHELM
Bibliothekanische Planung in der BRD.
DFW Dokumentation, Information, vol.20, no.2, January/February 1972, p.43–5.
Library organization in the German Federal Republic.

FREITAG, EVA-MARIA
Das Bibliothekswesen in Iran.
Zentralblatt fur Bibliothekswesen, vol.86, no.1, January, 1972, p.15–26.
Library system in Iran.

STEFÁNIK, VLADIMIR
Niektoré otazky d'alsisho rouoja a integrácie informacneho systemu.
Citadel, vol.21, no.2, 1972, p.41–4.
Information systems in Czechoslovakia, and the role of libraries within the system.

ORGANIZATION profile: Council on Library Technology. (COLT)
Information, vol.3, no.6, Nov.–Dec. 1971, p.338–40.

PEASGOOD, A. N.
The library of the University of the South Pacific.
New Zealand Libraries, vol.35, no.6, December 1971, p.246–50.

LAIS, RUDOLF, *and* SCHMITZ, HELGA
Der Aufban des Gesamtkatalogs der Universitat des Saarlandes.
Zeitschrift fur Bibliothekswesen und Bibliographie, vol.28, no.6, 1971, p.378–85.
The setting up of a union catalogue of the University of the Saarland.

GOLDBERG, I.
Interlibrary communication and loans in Israel.
ISLIC Bulletin, vol.3, no.2, December 1971, p.74–5.

GREGORY, RUTH W. *and* STOFFEL, LESTER L.
Public libraries in cooperative systems: administrative patterns for service. Chicago: American Library Association, 1971.
0 8389 0110 7
viii, 315p.; bibliog.

HOLLAND, JOANNA
Library council proposed for London.
The Times Higher Education Supplement, no. 19, 18th February 1972, p.6.
Library council as coordinating body for London University libraries.

Professional Activity

KUNZ, WARNER *and* RITTEL, H. W.
Information science: on the structure of its problems.
Information Storage and Retrieval, vol.8, no.2, April 1972, p.95–8.
The problems facing information science, particularly the need for a new generation of systems methods.

BLOHM, HANS
Ist die "Informatik" am praktischen Bedarf vorbeikowzipeit?
Nachrichten fur Dokumentation, vol.23, no.1, February 1972, p.30–1.
Does the concept of 'informatik' (information science) meet practical requirements?

BRIDGES, RONALD A.
The mad, mad world of information.
Journal of Systems Management, vol.23, no.1, January 1972, p.16–8.

VAGIANOS, LOUIE
Information science: a house built on sand.
Library Journal, vol.97, no.2, 15th January 1972, p.153–7.
Discusses the concept of information science.

DEBONS, ANTHONY *and others*
A career in information. Pittsburgh (Pa.): Pittsburgh University.
Interdisciplinary Doctoral Program in Information Science, 1971.
[12]p.

DEWEESE, L. CARROLL
Status concerns and library professionalism.
College and Research Libraries, vol.33, no.1, January 1972, p.31–8.

BOAZ, MARTHA
Some current concepts about library education.
College and Research Libraries, vol.33, no.1, January 1972, p.18–23.
Library education must be less involved with facts and content, more concerned with ideas and communication.

HORN, ANDREW H.
Time for decision: library education for the seventies.
Special Libraries, vol.62, no.12, December 1971, p.515–23.
A model for a master's degree program in library and information science.

ATHERTON, PAULINE
Putting knowledge to work in today's library schools.
Special Libraries, vol.63, no.1, January 1972, p.31–6.
New course content in the curriculum, computerized-assisted instruction and research projects in library schools.

DONOHUE, JOSEPH C.
Research on information seeking: its place in the teaching of librarians.
International Library Review, vol.4, no.1, January 1972, p.97–101.
Approaches to a study of 'library heurology'.

GRUNWALD, WILHELM
Aufgaben und Ausbildung der Bibliothekare in wissenschaftlichen Bibliotheken (mit besonderer Berucksichtigung Niedersachsens).
DFW Dokumentation, Information, vol.20, no.2, January/February 1972, p.47–9.
Tasks and training of librarians in scientific libraries.

BURGESS, ROBERT S.
Education for librarianship: U.S. assistance.
Library Trends, vol.20, no.3, January 1972, p.515–26.
Analytical review.

DENIS, LAURENT G.
A study of the need for Ph.Ds in library science in large Canadian libraries.
Canadian Library Journal, vol.29, no.1, January–February 1972, p.19–27.
Report on the results of a questionnaire circulated in the autumn of 1970 to Canada's leading libraries, concerning the establishment in Canada of a program of study for Ph.Ds in library science.

TABBANE, TAOUFIK
General problems of the training of documentalists in the developing countries.
La Rivista dell'Informazione, vol.2, no.6, November/December 1971, p.62–4.

ARNAUD, PAUL
General principles that could serve as guidelines for a training programme for documentalists.
La Rivista dell'Informazione, vol.2, no.6, November/December 1971, p.65–6.

AVIVI, E.
Training of information engineers and information scientists in Israel.
ISLIC Bulletin, vol.3, no.2, December 1971, p.67–73.

PETERS, A. E.
Why a special libraries section?
New Zealand Libraries, vol.35, no.6, December 1971, p.252–5.

ORNE, JERROLD
Research librarianship: essays in honor of Robert B. Downs. New York, London: Bowker, 1971. 0–8352–0487–1
xvii, 162p.

DUBE, WERNET
Über den Stand der bibliothekswissenschaftlichen Forschungstatigkeit in der Deutschen Demokratischen Republik.
Libri, vol.21, no.4, 1971, p.361–8.
On the status of library science research activity in the GDR.

WESSEX REGIONAL LIBRARY AND INFORMATION SERVICE
Directory of libraries (health sciences) in the Wessex Region. Southampton: the Service, January 1972.
(6)p.

INSTITUTE OF INFORMATION SCIENTISTS
Computers and information retrieval: glossary of terms. Manchester: the Institute, 1971.
[9]p.

KIPP, LAWRENCE J.
Management literature for librarians.
Library Journal, vol.97, no.2, 15th January 1972, p.158–60.
Annotated bibliography.

MEMBERS' ADVERTISEMENTS

Acceptance of advertisements for publication in Proceedings *does not imply Aslib support for or endorsement of the goods or services advertised.*

Members' advertisement rates: first 15 words (minimum), 50p; 3p for each additional word. 10p if box number required. (No agency discount.) A separate section of these columns is available to non-members at £3 per s.c.i.

Translations services

MEDICAL AND HIGHLY SPECIALIZED SCIENTIFIC TRANSLATIONS. S.M.Bonnekamp, FIL, Member of the Translators' Guild (Med. Science & Lit.), 47 Firs Close, Muswell Hill, London N10. Tel. 01-883 3962 during office hours. After office hours an automatic telephone answering machine will record messages.

BUILDING AND CIVIL ENGINEERING TRANSLATIONS from Russian and German into English. G. L. Cairns, MIL, 19 Kingsley Place, London N6. Tel. 01-340 8990.

TECHNICAL SWEDISH, DANISH, NORWEGIAN translated by J. T. Craddock, B COM, FIL, Ekard, Ray Park Avenue, Maidenhead, Berks. Maidenhead 24931.

JAPANESE/ENGLISH, RUSSIAN/ENGLISH translations. Chemistry, medicine, biology, zoology. D. A. Fraser, BA, MIL, 22 Gresley Road, London N19 3JZ. Tel. 01-272 5664.

WILFRED E. GOODAY, ARSM, DIC, C.ENG, MIMM, FIL. Member of Translators' Guild, Romanian and French. 161 Rivermead Court, London SW6. RENown 1912.

SCIENTIFIC TRANSLATIONS FROM JAPANESE, CHINESE, RUSSIAN, CZECH and other East and West European languages into English and/or German. A. K. Henn, BSC, 'Glenside', Lower Leigh Rd., Pontnewynydd, Pontypool, Mon. Tel. Pontypool 3689 (after 6 p.m.).

MEDICAL, PHARMACEUTICAL, BIOLOGICAL translations from French, Romanian and Portuguese into English and from English into French and Romanian. Dr J. Jacobson, 94 Temple Fortune Lane, NW11. 01-455 1010.

TECHNICAL TRANSLATIONS from Russian, German and Polish into English, B. Klipstein, BSC(HONS), 1 Glenview Grove, Shipley, Yorkshire. Tel. Shipley 58215.

TECHNICAL AND COMMERCIAL translations from English into Russian. Mrs O. Linsley, 31 Parke Road, Barnes, London SW13. Tel. 01-748 8822.

TECHNICAL TRANSLATIONS from Japanese into English. R. A. Scutt, BA, 48 Somerset Avenue, West Wimbledon, London SW20. Tel. WIMbledon 1713 (01-946 1713).

TECHNICAL OR COMMERCIAL translations into/from English, German, Dutch and French. A. M. H. Speller, FIL NGV, 6 Lakeside, West Ealing, London W13 8HN. Tel. 01-998 1045.

AUTHORITATIVE TECHNICAL TRANSLATIONS. Spanish, French, Italian, German, Portuguese, camera copy or printed. E. W. Sykes, FIL, 39 West Close, Wembley, Middlesex, HA9 9PJ. Tel. 01-904 4273.

Advisory services

IRAS: A NEW ADVISORY SERVICE. As much or as little advice and assistance as you need—anything from a half-day's talk to a six-months' assignment. Miss Helen Townley, I.R. Advisory Services, 117 Wickham Chase, West Wickham, Kent, BR4 0BQ. 01-777 7560.

For sale

CHEMICAL ABSTRACTS, 1907–1962, with decennial indexes. All bound. Offers to Technical Information Officer, Monsanto Chemicals Ltd, 10–18 Victoria Street, London, SW1H 0NQ.

CHEMICAL ABSTRACTS, 1939–54 bound, 1955–66 unbound; *Science Abstracts* 1939–51 bound, 1957–66 unbound. Offers to Mrs C. Austin, BSA Group Research Centre, Mackadown Lane, Kitts Green, Birmingham B33 0LF.

SUBSCRIBER TO *CHEMICAL ABSTRACTS* requiring only the even numbered issues (Inorganic Chemistry) would like to contact anyone interested in acquiring the alternative issues (Bio-Chemistry and Organic Chemistry) with a view to sharing the annual subscription. Offers to Librarian, Magnesium Elektron Limited, P.O. Box 6, Clifton Junction, Manchester M27 2LS. Tel. 061-794 2511.

NON-MEMBER'S ADVERTISEMENT

For sale

BRITISH JOURNAL OF PHARMACOLOGY & CHEMOTHERAPY complete to Oct. 1971: Vols 1-26 bound; indexes. *Journal of Physiology*, Vols 61-218 (Sept. 1971): bound to Vol. 183; indexes. *Biometrics* complete to Dec. 1971: Vols 1-21 bound. *Biochemistry*, Vols 44-51, all bound. *Proc. Royal Soc. Edin.*, Vol. 51 (1930-1931) to Vol. 64, bound; remainder to Autumn 1969 unbound. Binding fadeproof, waterproof library cloth in bright colours, contrasting trim, gold lettering, all in mint condition. Write to Box 272, Aslib.

BLUE CIRCLE GROUP

assistant information officer

The Associated Portland Cement Manufacturers Ltd. invite applications for the post of Assistant Information Officer in their library at their Research Department, Greenhithe.

Duties will include production of journal and patent abstract bulletins, information searches and preparation of bibliographies. Experience of this type of work is essential and knowledge of one or more modern languages would be a useful advantage. The position is open to either male or female applicants and with an age range from 22–45.

Applicants should have obtained either high "A" Level standards or University degree in appropriate subjects. The competitive commencing salary will depend upon qualifications and experience and there will be membership of a contributory pension scheme, profit sharing bonus and house purchase schemes and full welfare facilities.

Applicants should write giving full details of their career to date and personal details to:-

General Manager R. & D., The Associated Portland Cement Mfrs. Ltd., Research Dept., Greenhithe, Kent DA9 9JQ.

THE BRITISH COUNCIL

requires two part-time

INDEXERS

for MEDICAL LIBRARY at London Headquarters. Candidates should have a good general education, a library or indexing qualification is desirable. Considerable experience of subject indexing in medicine is essential, and in proof-reading desirable. Salary starting at £823 at age 25 or over, rising to £1162, for an 18 hour week. Optional non-contributory superannuation scheme with transfer arrangements.

Write quoting G/2/H3 to Staff Recruitment Department, 65 Davies Street, London W1Y 2AA, for further particulars and application form to be submitted as soon as possible.

'A Webster is a lovely thing, God wot'

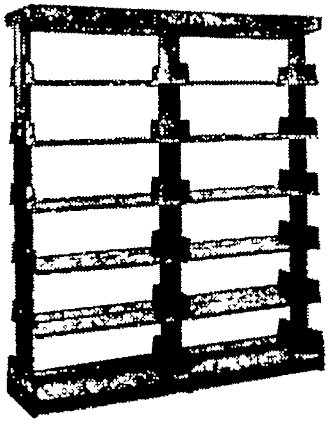
The Guardian

And so are you if you ensure that your Merriam-Webster Dictionaries—there are six now—are up-to-date editions. Write or phone (01-405 0805) for advice.

6 Portugal Street London WC2

BELL

LIBRARY FURNITURE



No. 262 BOOKCASE. This has been designed to depart from the conventional shape of Wooden Shelving. It has the advantage of a "see through" back and despite its light appearance it is extremely sturdy. It is made on a "knock down" system which allows for easy expansion and flexible arrangement.

Catalogues of full range of Library Furniture available on request.

B. Serota Ltd.

Contractors to H.M. Government and Municipal Authorities,
Acme Works, Rendlesham Road, Clapton, London,
E5 8PS Tel. 01-985 1736/1787

First for carpets
Dodson Bull

UP TO 30% DISCOUNT
BRANDED CARPETS

Wilton ● Axminster ● Oriental ● Tufted
● All makes available with full Manufacturers' Guarantees ● NO IMPERFECT GOODS SOLD ● Free delivery in U.K. ● Expert fitting service available most areas.

£200,000 carpets on display
In our extensive London and provincial showrooms
Write stating requirements or for introduction to carpet showrooms in most main cities. Free brochure on request to Dept. ALB

DODSON BULL CARPET CO. LTD

LONDON: 5 & 6, Old Bailey, EC4M 7ID. Tel: 01-248 7971. **BIRMINGHAM:** 164, Edmund St., B3 2HB. Tel: (021) 236 5862. **BOURNEMOUTH:** 268, Old Christchurch Rd., BH1 1PH Tel: 21248. **BRISTOL:** 2-3, Royal London House, Queen Charlotte St., BS1 4EX. Tel: 23857. **LEEDS:** 12, Great George St., LS1 3DW Tel: 41451. **MANCHESTER:** 55-61, Lever St., M1 1DE. Tel: (061) 236 3687/8/9. **NEWCASTLE-upon-TYNE:** 90-92, Pilgrim St., NE1 6SG. Tel: 20321/21428. **WESTCLIFF-on-SEA:** 495, London Rd., SS0 9LG. Tel: Southend 46569.

Open: 9.00-5.30 Mon-Fri. Sat. 9.00-12.00
(Manchester 9.00-4.00)

LIBRARY BINDING

This has been our trade since the last century, and in practising our craft we have given service to all types of libraries in many corners of the World.

We like to think we still bind books for libraries rather well, apart from our other activities as publishers and booksellers.

CEDRIC CHIVERS LTD
PORTWAY
BATH BA1 3NF

British Technology Index

CURRENT SUBJECT GUIDE TO BRITISH TECHNICAL JOURNALS

FOR TRACING AND RECALL

of {specific / recent} information

in the Field of Applied Science, Engineering and Manufacturing Technology

Monthly Parts and Annual Volume

THE LIBRARY ASSOCIATION

7 Ridgmount St. Store St. London, WC1 7AE

(Phone: 01-636 7543)

British Librarianship and Information Science 1966–1970

EDITED BY H. A. WHATLEY

A review of progress in the late sixties

£8 (*£6.40 to L.A. Members*)

Still available

Five Years' Work in Librarianship 1961–5

EDITED BY PHILIP SEWELL

£5.75 (*£4.60 to L.A. Members*)

THE LIBRARY ASSOCIATION

Assistant Information Officer

... for our Information Section which is involved in the collection, classification, collation and interpretation of data on limited companies, in different sectors of the food industry and also in the provision of library facilities. Reporting to the Information Officer he (or she) will be responsible for classifying data and for producing, and disseminating rapidly, accurate and up-to-date information. Visits to the City Business Library and other sources will be necessary.

Applicants should be educated to 'A' level, may hold an HND in Business Studies, and must be numerate. Previous experience in this work would be an advantage. Salary will be negotiated. Please write in confidence, quoting reference PR.473, to: Miss J. Pascoe, Personnel Officer, Spillers Limited, Old Change House, Cannon Street, London EC4M 6XB.

Spillers

Some recent major SRA publications in Computer Science

COMPUTING SYSTEMS FUNDAMENTALS

A programmed introduction to the field of data processing and computing.

0574 16077 9	Overview	£1.88
0574 16078 7	Techniques	£3.48
0574 16079 5	Techniques Notebook	48p

INFORMATION PROCESSING

A basic programme for introductory data processing

0574 16086 8	Text (hard cover)	£5.64
0574 16085 X	Text (soft cover)	£4.00
0574 16087 6	Study Guide	£2.12
0574 16088 4	Instructor's Guide	£1.36
0574 16127 9	Transparency Masters	£12.80

FLOWCHARTING TECHNIQUES

A supplementary text for all levels	0574 16096 5	£2.12

STANDARD COBOL

A complete programme in modular format for teaching the student to write COBOL

0574 16109 0	Text	£4.28
0574 16110 4	Instructor's Guide	£1.36
0574 16130 9	Transparency Masters	£12·80

For the full list of titles, please write for a catalogue.

computer science computing data processing

SRA Published by Science Research Associates Ltd.

part of the IBM organization

Orders to Richard S. Gothard & Co. Ltd.
Gothard House
Henley-on-Thames
Oxon RG9 1AJ Telephone Henley 3602

An Aslib Guide to
Information Sources

Value Added

2 1 AUG 1972

THE TAX AND THE CONCEPT

compiled by D. S. BUCHANAN

This guide provides details of organizations which can supply information on VAT together with a survey of the documentation on the 'value added' principle that has been produced in the last ten years.

Their are four main sections. The introduction explains what the value added tax is, how the VAT system came to be adopted and which countries use it. The second section lists organizations in Britain from whom information about VAT can be obtained. The third part consists of the bibliography, in which there are 155 references, covering general aspects of VAT, the proposed introduction of VAT in Britain, the experience of European and other countries in using this fiscal system, and the value added concept as a measure of company efficiency. The last section lists indexing journals which cover relevant material, and a list of periodicals cited, indicating those titles in which material can be found.

75p net; 60p to members *SBN 85142 041 9*

PLEASE SEND CASH WITH ORDER

Aslib Publications

Published in England by Aslib, 3 Belgrave Square, London SW1X 8PL
Printed by Alden & Mowbray Ltd at the Alden Press, Oxford

Aslib Proceedings

incorporating Aslib Information

ASLIB ENGINEERING GROUP CONFERENCE 1972

Costing library and information services

Value for money in Government library/information services C. D. OVERTON 325

Research by Aslib into costing of information services B. C. VICKERY 337

Financing a library/information service by operating a cost recovery system J. COOK 342

Teaching costing techniques to librarians and information scientists of the future R. STURT 350

Use, efficiency and cost of external information services A. KABI 356

ASLIB · 3 BELGRAVE SQUARE · LONDON SW1

Aslib Proc. vol. 24 no. 6 pp. 315-377 London, June 1972

Claude Gill Books end the search

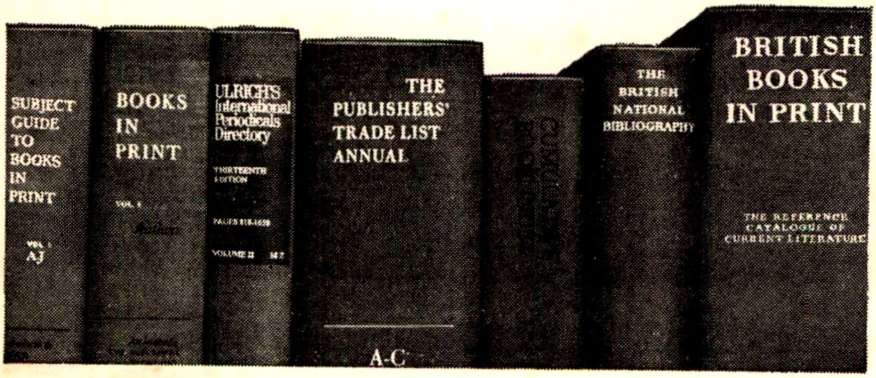
Books, journals and all your information needs – Claude Gill Books end your search.

Claude Gill Books offer you a fast worldwide service. The 120,000 books in stock include over 40,000 scientific and technical books. International banking arrangements ensure worldwide contact with book sources.

Expert staff, qualified in bibliographical research willingly solve your problems.

Worldwide journal subscriptions are available through Claude Gill Subscriptions
Aldermaston Court, Aldermaston, Berks.

Claude Gill Books, 481 Oxford Street,
LONDON W1R 2AQ. Tel: 01-499 5664 Telex 266538


SUBJECT GUIDE TO BOOKS IN PRINT
VOL. I A-J
BOOKS IN PRINT
VOL. I Authors
ULRICH'S International Periodicals Directory
THIRTEENTH EDITION
VOLUME II
THE PUBLISHERS' TRADE LIST ANNUAL
A-C
THE BRITISH NATIONAL BIBLIOGRAPHY
BRITISH BOOKS IN PRINT
THE REFERENCE CATALOGUE OF CURRENT LITERATURE

Aslib Proceedings

incorporating Aslib Information

VOLUME 24 JUNE 1972 NUMBER 6

© 1972 Aslib and contributors

Aslib Proceedings: incorporating Aslib Information *is published monthly and supplied free to members of Aslib. Subscription rates are £10 annually to non-members, or £2.50 to Aslib members requiring additional copies. Single copies £1, or 25p to members.*

Further information about Aslib's services and membership rates will be supplied on application to the Director, Aslib, 3 Belgrave Square, London SW1X 8PL. Tel. 01-235 5050. Telex 23667; answer-back, Aslib London.

ASLIB CALENDAR 1972

July

THU.6.	Aslib symposium (with BSI): 'UDC: revision or relegation'. Royal Aeronautical Society, 4 Hamilton Place, W1.
FRI.14–SUN.16.	Computer Information Group Conference, University of York.
WED.26.	Audio Visual Group evening meeting. Aslib.

September

SUN.24–WED.27.	Aslib 46th Annual Conference, Ranmoor House, University of Sheffield.

October

WED.18.	Aslib evening meeting: 'Electronic intelligent machines', by Dr Igor Alexsander (University of Kent). Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1.
TUE.31.	Transport and Planning Group/LA RSIS one-day conference: 'Sources of information for leisure, recreation and tourism'. Library Association, 7 Ridgmount St, WC1.

November

TUE.21.	Aslib one-day study conference: 'Management in a service context.' 36 George Street, Manchester.

ASLIB INFORMATION

New Members

CORPORATE

(specialized Group interests are given after names, where relevant)

Name	*Location*	*Representative*
Heffer, W. & Son Ltd	Cambridge	R. J. Machesney
Trehearne & Norman, Preston and Partners (*Eng, SSG*)	London	D. A. Howarth
Public Interest Research Centre (*Econ, Trans*)	London	C. Medwar
Publishers Association (*Bio, Chem, Econ, Eltron, Eng, SSG, Tex*)	London	P. Phelan
Royal Institute of International Affairs (*Econ, SSG*)	London	Miss D. Hamerton
Schools Council (*AVG, CIG, SSG*)	London	Mrs S. Jetha
Boreal Institute for Northern Studies	Edmonton, Alberta	Mrs G. Cooke
Punjab Agricultural University (*AVG, CIG*)	Ludhiana, Punjab	T. P. Saxena
Gabinete da Area de Sines (*Econ, Eng, SSG, Trans*)	Lisbon, Portugal	A. Martins
STINFO, Office of Administrative Services	Washington DC	Miss M. B. Zenich

INDIVIDUALS

J. D. Dews (*SSG*)
C. W. Hanson
J. A. Hennessey (*SSG*)
Mrs M. Y. Keary (*Econ*)
D. V. Kennelly (*SSG*)
Miss J. A. Lonergan
Sister Raphael Mulkern
Miss P. A. Pinder (*Chem*)
Miss V. J. Rice (*AVG*)
Miss J. A. Tolley
C. M. Turner (*CIG*)

Aslib 46th Annual Conference

The planners of Aslib's 46th Annual Conference—to be held from 24th to 27th September in Ranmoor House, University of Sheffield—have chosen to be strictly practical this year. Their theme—the role of external information services of all kinds (not only computer based systems) in relation to the work of the local information unit and library—is a problem of some urgency and the development of these services in a form that will best serve the information community is of concern to more and more people in the library and information world.

Speakers at Sheffield will include D. V. Arnold, Petrochemicals Division of Imperial Chemical Industries Ltd; Harry East of Aslib Research and Development Department; J. E. Terry and P. J. Jones of UKAEA, Harwell; Helen Townley, IR Advisory Services, and J. S. Rippon, Metal Box Company Ltd. They will take a searching look—very much from the user's point of view—at the basic needs of an information service, the systems that exist and the criteria for evaluating them, and the organization and economics of using external services for SDI and retrospective searching. This will be illustrated by some very interesting case histories submitted by members, from which discussion will arise and it is hoped valuable lessons will be drawn. Manpower implications and the kind of information worker who will be needed in this different kind of activity will also be discussed and a panel which includes Dr W. E. Batten of UKCIS, H. F. Dammers from Shell's Woodstock Agricultural Research Centre, C. G. Giles of the Department of Trade and Industry, and B. T. Stern, Wellcome Foundation Limited, will lead the final discussion session, which should crystallize the problems raised and from which it is hoped some constructive initiatives for the future will emerge. Delegates will have an opportunity to study and question the services discussed with those taking part in the exhibition of commercial information services that is being staged in Ranmoor House as part of the Conference.

The visits and social programme are always an important feature of an Annual Conference and Sheffield is a generous provider here. To name a few on the long list: Sheffield University Library and a description of the work of the Postgraduate School of Librarianship; Sheffield Central Library, Graves Art Gallery, Crucible Theatre and Cutlers' Hall; a steelworks (trousers and flat shoes, ladies, please) and, for thirsty members, Whitbread's Exchange Brewery. Sheffield is a proud city in a beautiful countryside and there will be a conducted tour of the town and the Abbeydale Industrial Hamlet and an excursion to romantic Haddon Hall. For those who can spare the time on the final afternoon, it has been possible to arrange a visit to the National Lending Library for Science and Technology at Boston Spa.

Further information and an advance programme with registration details for the Conference, which is expected to draw a large attendance from the United Kingdom and overseas, can be obtained from the Conference Organizer, Aslib, 3 Belgrave Square, London SW1X 8PL.

Computer Information Group: annual conference at York

The first annual conference of the Aslib Computer Information Group will be held at York University from Friday, 14th July to Sunday, 16th July 1972. A number of topics relating to the collection, handling, and dissemination of computer information will be discussed during the sessions, including: 'Computer literature: a bibliometric survey', by E. G. Jones (INSPEC) and A. Pritchard (National Computing Centre); 'Computer education' (speaker to be announced); and 'The ITIRC (IBM Technical Information Retrieval Centre) System', by R. Crompton (IBM UK Laboratories). In the final session the chairmen of each of the Group's Working Parties will review the work carried out by each Working Party during the last year.

A programme of visits has also been arranged to the University Library, The National Lending Library, the Yorkshire Abbeys and to York Cathedral. The conference fee is £16.00, which includes accommodation in a University hall of residence. For further information contact the conference secretary, Mr F. C. A. Exon, University College Computer Centre, 19 Gordon Street, London, WC1.

Leisure, recreation and tourism: sources of information

A one-day conference on sources of information for leisure, recreation and tourism is being organized jointly by the Aslib Transport and Planning Group and the Research, Special and Information Section of the Library Association at the Library Association, 7 Ridgmount Street, London, WC1, on Tuesday, 31st October 1972. Although aimed chiefly at librarians and information officers much of the material discussed will be relevant to the needs of planners and others. The purpose of the conference will be to examine and discuss the various information problems facing those involved in the documentation of leisure, recreation and tourism.

An exhibition of source and background material will be arranged and an exhibition catalogue will be issued. The conference fee of £6.00 includes morning coffee, lunch and afternoon tea. The proceedings will be published subsequently.

Further information can be obtained from the conference secretary, R. L. McLennan, The Library, Royal Town Planning Institute, 26 Portland Place, London, W1N 4BE. (Tel: 01-636 9107, ext. 11.)

IMEX–Information for Marketing Exhibition

Over £100 million a year is spent in Britain each year in producing information that is of value to the marketing executive, yet the larger part of this information is wasted, as management is not aware of its existence. It is to help combat this situation that Aslib, the Institute of Marketing, and the Industrial Marketing Research Association have combined together to sponsor a mobile exhibition of information and marketing services that will tour Britain from 2nd October to 15th December spending a week at each of nine locations in the provinces and two weeks in London. At each of the nine provincial stops the exhibition will form the basis of a 'Marketing Information Week', with a full programme of seminars, courses and meetings, designed to show just how much *relevant* information is available easily, cheaply and quickly—provided you know where to look for it.

IMEX will cover (a) *Types of Information*: statistical data, market data, product information, company information, technical developments, economic developments, commercial intelligence, distribution data and location data; and (b) *Marketing Services*: marketing research, subscription services, multi-client surveys, public relations, sales promotions, direct mail advertising, and methods and equipment for the storing, handling and retrieval of information. The exhibition is designed to cater for 20,000 visitors, and a special feature is that exhibitors can participate for as little as £25.

All enquiries should be addressed to the organizers: IMAC Research, Lancaster House, More Lane, Esher, Surrey. Tel: Esher 63121.

Pollution: sources of information

The Proceedings of the one-day conference on 'Pollution: sources of information', which was held jointly by the Aslib Transport and Planning Group and the Library Association Reference, Special and Information Section in October 1971, have recently been published. Edited by Kay Henderson, Reference Librarian for the London Borough of Lambeth, these Proceedings form the first British book to assess through the eyes of the expert searcher how to find out about pollution.

Gerald Leach, Science Correspondent of *The Observer*, Dr Norman Lee, Director of the Pollution Research Unit, Manchester University, and four key information workers, W. D. Piggott, V. O. Benning, D. S. Moulder and C. N. Harvey, have contributed the six papers. They discuss what is needed and what is available as source material for information on air and marine pollution, noise, freshwater pollution, solid wastes and pollution by pesticides and radioactivity. Over such a field they could only give signposts, but paths of investigation are suggested through the immense literature on pollution. There are over 200 references, an index to organizations referred to and a further reading list.

Published by the LA RS & IS, the Proceedings cost £2.00 to Members of Aslib and Members of the LA, and £2.50 to others. Orders should be sent to the Library Association Publications Office, 7 Ridgmount Street, London WC1E 7AE.

An evaluation of International Patent Classification for information retrieval

FROM: *P. N. Sharma and P. W. Ashton*

A classification for in-depth retrieval of patent information on knitting processes and machinery was required at Courtaulds, Coventry, last year. Rather than devise an in-house classification, it was decided to examine first the possibility of adopting International Patent Classification (IPC) for this purpose. As more and more patent offices are using this classification, in addition to their own, this course, if found satisfactory, offered the obvious advantage of using the classification marks assigned at the source without any further effort at classification at the user end.

With the above aim in view, it was imperative that the consistency or agreement in the application of IPC by various patent offices be examined. Accordingly, in two separate sets of comparisons, IPC marks assigned by the British Patent Office were checked against the classification marks allocated to their corresponding US patents by the US Patent Office and, similarly, Netherland patents were checked against their corresponding German patents.

The results of above sets were divided into the following five categories depending on the degree of agreement between them:

A–complete agreement in all details;
B–agreement up to main group(s) level of a sub-class;
C–agreement only up to the sub-class level;
D–agreement up to sub-class level in only one of a number of classification marks assigned;
E–complete disagreement.

The results are tabulated below indicating number of patents falling in each category, figures in parentheses showing percentages on the total sample.

As is obvious from the above results, even if the classification marks falling in category *B* were considered acceptable, the combined percentage of results in categories *A* and *B* is far too low to recommend the adoption of IPC for information retrieval on the present premises.

Set	*No. of patents examined*	*A*	*B*	*C*	*D*	*E*	*AB*
British vs. US patents	60	12	9	1	15	23	21
		(20)	(15)	(2)	(25)	(38)	(35)
Dutch vs. German patents	54	17	14	9	5	5	31
		(32)	(26)	(17)	(9)	(17)	(58)

Admittedly not a very large sample has been examined, nor any statistical methods employed in the selection of the sample. Nevertheless this investigation has shown rather startling results and further work to substantiate these findings and to identify the reasons for such divergence will be of interest to the users of IPC.

M.Sc. in Information Science at University College London

A new one-year course in Information Science has been established by the School of Library, Archive and Information Studies. The new course, leading to an M.Sc. in the Faculty of Science of the University of London, is intended to attract science graduates of research potential who have theoretical interests in Information Science and who would hope eventually to contribute to the development of the subject as an autonomous science.

The course has been recognized for the award of grants by OSTI and the first students will be admitted in October 1972. Further details and application forms are obtainable from the Registrar, University College London, Gower Street, WC1.

New citation index for the social sciences

At the recent 'Conference on access to knowledge and information in the social sciences and humanities' held in New York, Mr Melvin Weinstock of the Institute for Scientific Information announced the publication, beginning in 1972, of ISI's *Social Sciences and Humanities Citation Index*. Produced on the same lines as ISI's *Science Citation Index*, the social sciences index will cover articles, book reviews and correspondence appearing in approximately six hundred key journals in the fields of anthropology, community health, demography, economics, educational research, ethnic studies, geography, history, law, linguistics, management, marketing, political science, psychiatry, psychology, sociology, statistics, and urban planning/development.

Anyone wishing more information or wanting to make suggestions on any aspect of the *Social Sciences and Humanities Index* should contact: Melvin Weinstock, Institute for Scientific Information, 325 Chestnut Street, Philadelphia, Pa. 19106.

Research at the PNL School of Librarianship

The use made of information contained in patents

A preliminary research project into subsequent publication in other types of literature of the information on inventions and their patents commenced on 1st April 1972, at the School of Librarianship, Polytechnic of North London. The project is funded by an OSTI grant of £6,800. Mr F. Liebesny is acting as managing consultant and Mr P. S. Hunter is project supervisor at the School. Patent analyses and the literature searches etc. will be conducted by Mr J. W. Hewitt and Miss M. Hannah. Other information will be obtained by means of questionnaires and interviews.

It is hoped to be able to determine the potential loss of information if the patent literature is not fully utilized.

A thesaurus for economics research papers

Mrs Heather Robinson has been appointed (as from 1st June 1972) as Research Officer to develop a controlled vocabulary of terms in classified and thesaurus form to be used at the Library of the University of Warwick in the development of a service involving working papers in economics. The Library receives these papers (unpublished at the time of receipt) from universities and other institutions throughout the world and quick and easy access to their subject content is essential if the many requests for information from them are to be met effectively.

The funding of the work is assisted by the University of Warwick and the work is due to be completed by June 1973.

Mr Derek Langridge is project supervisor.

Readability of print project at the RCA

OSTI has awarded a grant of £38,500 over three years to support three research projects by the Readability of Print Research Unit at the Royal College of Art. The first is to establish the value and significance of typographic distinctions in the presentation of information. The second is to ascertain the relationship between image quality and reading efficiency; and the third is to study the relative legibility of alternative shapes representing the same letter.

The Unit hopes that its findings will be of use to publishers, printers and others who provide information services. It also plans to publish clearly defined and realistic specifications for the design and visual presentation of a wide range of scientific information. These will include specifications for abstracts, indexes, tables, formulae, charts and diagrams.

Reference citation recommendations

The Medical Section of the Library Association has drawn up recommendations for the citation of references to serve as a guide to editors, authors and others concerned with medical and scientific publications. They agree closely with the basic principles specified in the latest draft revision of British Standard 1629. Copies of the document containing the recommendations are obtainable from the Secretary, Medical Section, Library Association, 7 Ridgmount Street, London, WC1E 7AE.

Meeting of the Technical Information Panel of AGARD

At the request of the Turkish authorities, the Technical Information Panel of AGARD (Advisory Group for Aerospace Research and Development) is holding a conference in Ankara, on 23rd–24th October 1972, on the subject of 'Government assistance for technical information in industry, and simple mechanization for small information centres'. The conference will take the form of a basic course on how such centres should be established and developed, and what sort of assistance from Government sources should be looked for.

Six papers will be presented on various aspects of the initiation and growth of small information centres; one paper on assessing and presenting to management the needs of such centres; three papers on the various forms and levels of information transfer to industry; a discussion session; and, finally, a summing up and evaluation of the conference theme.

Attendance is normally limited to citizens of the NATO nations. Applications for invitations from anyone in the UK should be addressed to: Mr. S. C. Schuler, UK Member, Technical Information Panel, Defence Research Information Centre, St Mary Cray, Orpington, Kent BR5 3RE.

World Micrographics

'World Micrographics', the International Micrographics Conference and Exhibition, is to be held at the Grosvenor House Hotel in London from 22nd to 25th May 1973. The programme will consist of three sessions: formal papers, tutorial sessions and workshop seminars.

Formal papers are invited on the following subjects: international copyright, the micrographics market in Europe, international standards, developments in computer-output-microfilm and computer-input-microfilm, micropublishing, information storage and retrieval, systems analysis and design, materials, processes and equipment. Summaries of formal papers should be not less than five hundred words and should be submitted by 31st July 1972 to: The Secretary, World Micrographics Programme Committee, 109 Kingsway, London WC2B 6PU.

Papers are also required for the workshop seminars and details of the nineteen subjects in the field of micrographics, with which these papers will deal, are also obtainable from the above address.

Standard presentation of research and development reports

Advice for those engaged in the preparation of research and development reports is given in a new BSI publication, BS 4811 *Presentation of research and development reports*.

The standard lists the information that should be provided, with notes about planning the work and arranging the material. It specifies requirements for such matters as the information to be shown on the front cover and title page, the construction and position of report numbers, tables and illustrations, pagination and reference numbering. It makes recommendations for producing reports, giving advice on type style, layout, legibility and quality of paper and covers.

The price including postage is 85p. It is available from: BSI Sales Branch, 101 Pentonville Road, London, N1 9ND.

Information wanted

We recently received the following request from Mr Alan Thomas, Senior Lecturer at the Ealing School of Librarianship:

'I am researching towards a comparative study of education and training in library classification and cataloguing in the USA and the UK 1872–1972, and would be most grateful for any supporting data, including the personal memories of younger, older, and retired teachers, students, and practitioners of librarianship.'

If any member can supply Mr Thomas with any information of this kind, then they should write to him at the School of Librarianship, Ealing Technical College, St Mary's Road, London, W5.

People and places

PROFESSOR P. HARVARD-WILLIAMS, MA, DIP.ED., ALA, ANZLA, FLAI, has been appointed to the newly-created chair of Library Studies at Loughborough University of Technology. He is at present Dean of the Library School and Professor of Library Science at the University of Ottawa. Prior to this Professor Harvard-Williams was Director of the School of Library and Information Studies at Queen's University, Belfast.

The present Director of the School of Library and Information Studies at Queen's University, MR PHILIP WHITEMAN, MA, FLA, has been appointed Head of the Department of Management Studies at the College of Librarianship Wales. At CLW he succeeds MR RONALD STURT, who left Aberystwyth in January to be Chief Librarian at the City of London Polytechnic.

Another recent appointment at the College of Librarianship Wales is MR DONALD MASON, MA, FLA, who becomes Head of the Department of Information Retrieval Studies. Mr Mason will be well known to many Aslib members as manager of Information and Library Services at ICI's Organic Division. He succeeds MR DAVID BATTY, who is now in Canada as Professor of Library Science at McGill University, Montreal.

BRIEF REVIEWS

COURTAULDS VOCABULARY OF TEXTILE TERMS. 2nd edition. Five languages: English, French, German, Spanish, Russian. London: Courtaulds (Marketing Division), 1972. (Distrib. through The Textile Trade Press.) 224 pp. £1.95.

This has been revised and expanded since the first edition in 1964, although with the development of metrication it was thought best to omit the conversion tables which appeared in the 1964 edition. Entries are specific to the textile industry and are grouped by fields within the industry. Equivalent terms are displayed across two pages and assigned a page and line number. There is an index of terms in each of the languages concerned, in which the page and line location for each term is given, facilitating reference to the main body of the book.

EXHIBITIONS AND CONFERENCES YEAR BOOK 1972. London: York Publishing Co., 1972. 448 pp. £4.30.

Exhibitions held in the United Kingdom and Eire are listed in three sequences: (a) chronologically, (b) classified under industrial groups, (c) regionally. These are followed by details of exhibition venues in the UK arranged alphabetically by town, a directory of exhibitions organizers, an agricultural show calendar and a directory of exhibition and conference contractors and services.

A calendar of European exhibitions arranged by country then date follows. These exhibitions are also listed in a classified sequence, and details of those receiving support from the Department of Trade and Industry are given.

The yearbook also lists conference venues in the United Kingdom and Eire, a calendar of UK conferences, details of associations who hold conferences, and a directory of principal Chambers of Commerce in the UK.

A copy of this publication is held at Aslib.

Value for money in Government library/information services

C. D. Overton

Chief Librarian, Department of the Environment
(Housing and Construction Wing)

Paper presented at an Aslib Engineering Group Conference on 'Costing library and information services', 25th–27th February 1972

Introduction

THERE IS a section entitled 'Too much vs Too Little' in Robert Townsend's book *Up the Organisation* (London: Michael Joseph, 1970) which has a direct bearing on the subject of this paper: 'A tight budget brings out the best creative instincts in man. Give him unlimited funds and he won't come up with the best way to a result. Man is a complicating animal. He only simplifies under pressure. Put him under some financial pressure . . . then he'll come up with a plan which, to his own private amazement, is not only less expensive, but also faster and better than his original proposal which you sent back'!

Having given this quotation, however, it is realized that a Government Department requires the most efficient library information service that it is possible to get and which equates with its needs. Further, this service cannot be had 'on the cheap' for, as De Solla Price states in *Little Science, Big Science,* technical and scientific information is doubling its output every fifteen years. You will remember the maxim that 'Work expands so as to fill the time available for its completion' worked out by C. Northcote Parkinson in his book *Parkinson's Law or the pursuit of progress,* published in 1957. The purpose of this paper is to mention some of the ways the Government library service is trying to cut its costs, produce a more effective service and combat Parkinson's law.

I would like to discuss this under four heads. First, costing the library service and the problems involved; secondly, the cost effectiveness of the service; thirdly, increasing efficiency, and here it is realized Work Study is being touched on; and *finally,* the application of some of these techniques to one library, with particular reference to publications. This paper will not be dealing with theory, but for those interested a list of references which have been found useful is appended. The paper will cover some of the practical problems to be faced, and possible solutions.

1. Costing

As this is attempting to be a practical paper the major problem involved—particularly as far as Government libraries are concerned—is assessing costs, and especially support costs. It is comparatively easy to find staff salaries and the publications vote, but after that point problems begin to occur. It is much more difficult to estimate the overheads, how much money should be allocated per individual for travel, conference, allowances, etc. How are rates of a Government Department assessed? What funds should be allocated for heating, lighting facilities, cleaning, telephones, postage? How much money should we allocate to support services such as centrally run messengerial services, central typing services, central photocopying services, postage, etc? Needless to say this problem has been examined centrally and certain information produced which can be averaged for various parts of the country and various grades of staff. For instance the additions to a librarian's ordinary salary (post-5.7.71 figures) covering SET, National Insurance, and Superannuation, on a £2,500 salary would be as much as £670.

Incidental expenses such as postage, telephones charges, stationery, and small machinery used in the day-to-day work of the staff will average, in an ordinary office, some £160 but in a library this is likely to be some £200 per annum, per individual.

The accommodation provided, concerned solely with the space taken up by staff, but including rents, rates, heating and cleaning, averages from about 26 per cent of the basic salary for central London down to 15 per cent for smaller provincial towns. This would mean an addition of approximately £650 dropping to approximately £375. Our £2,500 librarian in central London will therefore cost his Department in the region of £4,020 with all support costs taken into account or an increase on average salary cost of 62 per cent for central London. This will be £2.50 per hour. These costs do not include the supporting services such as typing, post room services, messengerial services, duplicating, etc. These costs could add as much as another £500 per head per annum.

In addition to staff costs there are also accommodation costs for the library itself; these average from £15 per square foot per year in prestige offices in central London down to as little as 40p per square foot per annum in the small provincial town. It should be noted, however, that rents in some London offices are still remarkably low and a lot depends on the astuteness of the estate surveyors and the contract branch in obtaining long-term leases. In the library services there are also costs of large-scale equipment, for example, tape typewriters, computer time, shelving, etc.

Finally we have the costs of the special support services, for instance, typing services, which run at £1,540 upwards, depending on the grade of the typist, for central London for a year—including full support costs. Post room services, messengerial services, duplicating services, printing services and the cost of this will depend on the library's use of them. For the purpose of these examples a daily rate is based on 226 working days per year or for an hourly rate there are 7.2 working hours per day (London) and 7.4 outside. It is salutary to remember that when there is a meeting of four junior and medium grade staff it may well be costing in the region of £11.80 per hour or nearly £1.00 every five minutes. Bearing this cost in mind has a remarkable way of limiting any meeting and preventing discussion being unduly prolonged.

2. Cost effectiveness

Cost effectiveness could be designated as the assessment of the lowest cost of a service to clients, compared with the fulfilment of their real needs.

To apply these terms to the information system in Government libraries the following have to be considered:

(a) The cover of the prescribed subject field.
(b) The time taken to insert information into the system.
(c) The recall effectiveness of our system.
(d) The precision of recall.
(e) The user effort for recall.

From a Government library viewpoint, cover of the prescribed subject field ((a) above) is not always as easy to accomplish as with many other types of libraries. It is seldom possible to provide an instant service on a new subject, for frequently key publications are no longer available from our suppliers and have to be searched out in the second-hand and antiquarian market. With changes in Government policy, the reallocation of duties to Departments, the development of new Departments, there is a constant need to watch trends and general Government policy in order to be prepared for changing demands on our services. Another task which we have to watch carefully is the user need. For instance, in the Foreign and Commonwealth Office the library service is growing at an average rate for an historical library. There is need to retain certain classes of material in order to provide precedents for action taken, to compare proposed developments with past decisions, to be able to show the development of a programme or idea, to provide historical information, etc. In other sections, such as the Ministry of Agriculture, Fisheries and Food, research undertaken many years ago and recorded in scientific journals or reports may become of prime interest many years later with changed needs and developments. On the other hand, as far as the Department of the Environment's Construction Wing libraries are concerned, older material is very seldom called for and there is a pronounced tendency to concentrate on the production of the past five to ten years, which necessitates an extensive weeding programme. Whatever policy is appropriate to the needs of the Department served this policy must be adhered to strictly, if real cost effectiveness is to be obtained.

The speed of capture of the new article, recently published report or book, its recording, insertion in the information system, its availability for recall and the dissemination of this information to those who need to know ((b) above) all contribute to the effectiveness of the system but at the same time should be based on client needs. One current information service, primarily concerned with current politics, had an information base which changed so rapidly that a weekly listing (the Monday publication covered articles appearing in the previous week) was essential. On occasions when there were periods of crises this developed into a twice weekly publication. In the DOE Construction Wing, which is practitioner-orientated, there is a fortnightly service which is just adequate, as material in it was published between three to four weeks earlier. It will be noted that the more frequent the publication of the current awareness service and the more up-to-date the information included, the greater is the novelty factor retrieved for our clients. However, this speed can seldom be attained without some loss in comprehensiveness, accuracy and effective abstracting. The task of the organizer is to balance these factors against user requirements to obtain the most effective result.

The recall effectiveness (c) should not be judged by a 100 per cent maximum—it must also be equated to the cost of recall. The problem of assessing the value of library services on a cost basis leads inevitably to an evaluation of its cost effectiveness. For instance, in a current publication *Bibliography on the application of computers in the construction industry 1962–1971* the problem of covering the subject field was found to be a quite formidable one because of the scatter of article references. To supplement the library's own resources it was decided to purchase a number of commercial abstracting and indexing services and save the time-consuming task of a direct extensive literature survey. It was found that five of these services plus the Department's own survey gave a cover of roughly 2,500 journals likely to carry articles of interest. Further, these services brought in a mass of report literature, pamphlets and some books. These services were, however, merely a first analysis, for those which were abstracting journals usually gave indicative abstracts only. Thus the library staff needed to examine each of the selected references, produce abstracts where these were not available, and critically examine those abstracts which were already in being, with a view to slanting them to the needs of the clients; and also, incidentally, correcting some of the references which had become corrupted in the original selection and printing process. Working through this material it was found that approximately 95 per cent of the total references were obtainable relatively easily but the remainder would have taken an increasing effort to locate with a rapidly rising and disproportionate staff cost. It was decided therefore to ignore this remaining 5 per cent for, after discussion with Departmental users, it was found that its production could not be justified on a cost–benefit basis. The inclusion of 95 per cent of references traced was our break-even point for this bibliography. Cost effectiveness has to be reassessed with every change of factors affecting work in progress.

The precision of recall (d) depends on the depth of indexing as well as the up-to-dateness of the system used. With constant changes and continuing development in the construction industry, it has been found necessary to print out a revised and consolidated UDC classification system every two years. It is only by a very careful and close watch on the method of recall—mainly the classified catalogue—and a careful comparison of its schedules with the classification needs of new publications added to stock that it is possible to develop the detail of our scheme and so maintain a high precision rate of recall. The greater the precision obtained for the insertion of information, the lower the user effort for recall (e). But it should be noted also that the greater the precision the greater the development work costs and here again a balance has to be made which will vary from library to library.

The benefits of an information system can be judged by:

(f) A comparison of systems reduced to a cost basis system.
(g) Saving clients' time.
(h) The utilization of full information in decision making.
(i) Stimulation of ideas by a current information service.

(j) Direct income from the information system.

Alternative methods of obtaining information (f) sometimes shed a clear light on the value of the present service. It has been suggested that the cost of the library service divided amongst the professional staff of the Construction Wing of the Department of the Environment would allow everyone to receive £45 each year for the purchase of books, periodicals, etc. However, when we came to analyse the periodical circulations and the books the proposer of this change had borrowed from the library, it was found that the cost of this service was just on £80 for the previous year. Further, he had put a certain number of queries to the library during the year which he would have had to either find out for himself or get his PA to devil for him. In one case the research would have been done at too high a level and in the other, too low. In addition, by eliminating the library, the professional staff might be helped but only if they were good bookmen and worked in London. (Trials have been made with local purchase in smaller provincial towns and these have not been particularly successful.)

The proposal would of course have done nothing to help the extensive technical and management staff employed by the Department. There would have been no enquiry service either for those within the Department or in other Government Departments or the public.

None of the published services such as the current awareness of world literature on the subject would have been available either for the Department or the public. The very considerable amount of exchange material received would have to be purchased. Finally, ancillary services such as that for translations would have to be undertaken elsewhere in the organization.

The library service can be instrumental in saving staff costs (g) for the average salary plus support costs of a professional man—architect or engineer—is £6.30 per hour whereas the library enquiry point is manned by staff averaging £2.91 per hour. Obviously the more work the professional can *properly* delegate to the library the greater will be the organization's savings in staff costs. In the same way the more the library enquiry point staff can delegate its routine work to clerical staff at £1.29 per hour (Clerical Assistant) or £1.68 per hour (Clerical Officer) the more high-grade enquiry work can be accomplished.

As in the firm, so in the library it is necessary to split up duties into those suitable to various grades of staff, and ensure that our highest paid staff are concentrating on work appropriate to their grade.

3. Increasing efficiency

In all Government libraries our purpose is to provide a positive service slanted to the needs of our Department. At the same time we want to reduce our own costs whilst increasing our efficiency and the value of our service to our clients in order to maximize the cost benefit of our work. This is a constant effort, for if we are to combat continuously rising staff and other costs we need to have a continuing programme for examining our routines in an effort to increase their efficiency. The following are but a few of the many pointers to increasing efficiency which have been found useful:

(*a*) For any new service, any new listing, any new index or record, it is necessary to ask:

'Does it need to be done?'
'Does our client know the cost of the service he is requesting?'
'What value do we or our clients get from it?'
'Is the output value greater than the production costs?'
'Is there a more efficient way of obtaining the same results?'

(*b*) To particularize the problem of increasing efficiency it might be useful to relate it to the Construction library service based on Lambeth Bridge House. The major work here, as in most other libraries, is answering enquiries, and it is for this essential purpose that the major staff effort has been geared. In fact, during last year there were 212,966 enquiries and 226,005 visitors to the library system: that is just over ten enquiries every six minutes of every working day of the year, or two visitors every minute of every working day of the year. Over the library system as a whole the staff and other costs for this type of work approximated 29p per enquiry and for loans of 161,379 per year the average cost was 11.5p per loan. This latter figure also covers retrieval of publications from the shelves and from individuals in the shape of overdue loans, together with shelving returned material. To maintain our standards and at the same time reduce our costs, the clerical routines for loads were examined and an improved loans system introduced to reduce staff time costs. At the same time an improved enquiry form was produced. The fundamental way of improving the cost effectiveness of the enquiry point, however, is by an improvement in the effectiveness of the recall system as well as an analysis of enquiries. In order to prevent work of a repetitive nature a series of standard replies or reading lists or handouts or advice on other sources of information was started. In addition, the answers to those enquiries which have taken a time to complete or are likely to be requested again, were indexed. Finally, in the subject fields being covered the literature is advancing ahead of the classification schedules. Therefore, in an effort to improve recall, those sections of UDC which apply to the construction industry have been consolidated in a single publication, *Information on Building*, and where appropriate the schedules in BS 1000 have been extended with our own terms, prefixed by letter the 'W'. These will remain until such time as the appropriate schedules in BS 1000 are revised and extended. Examples of this are, 'labour only sub-contracting' at 69.005.222 and 'VAT' at 336.223.

(*c*) One of the advantages of being in the Civil Service is that from time to time there are opportunities for calling in experts to assist in the efficiency of the service—the O & M team—the staff inspectors. These advisers are to help provide the most efficient service possible, which is also the library's objective. Whilst on the library staff there is expertise on library techniques and methodology, these consultants are able to look at library problems with a different type of expertise, and have the time to investigate library problems in depth and propose new and possibly shorter ways of obtaining the same ends. It would appear that close co-operation between the librarian and the O & M team or staff inspectors can only result in benefits to the library.

(*d*) From time to time there are demands on the professional and other staff of the library which either need an expertise which is not readily available or involve a work load which cannot be taken on, yet the work itself would be of value either directly to the library or to our clients. Rather than resist these assignments the value of employing outside consultants for the work should be investigated. One of the advantages of this system is that in many cases the 68 per cent overheads are not incurred, merely the basic salary. It is possible to employ for short periods those who have considerable expertise and can bring this to bear on problems, without having the routine interruptions of the Departmental library staff. Finally the payment is usually for the completed job and the costs do not escalate.

(*e*) Developments in the information field are providing us with more efficient ways of increasing our output and in some cases of cutting our costs. For instance, through the efficiency of the NLL it is possible to cut periodical storage costs. In spite of utilizing this service extensively in the DOE Construction Wing library, an annual sum of £720 is expended for central London floor space, with lesser amounts in sixty-seven other libraries in the system. To this should be added the very small cost of £200 per annum for periodical binding, so that the total annual expenditure is £920. This already low expenditure will only increase at 5 per cent per annum or £36 because of the retention policy. Yet even these low figures can be reduced. If microfilming is introduced for those periodical articles which are indexed or abstracted, it is estimated that four 100 ft rolls of film in cassette form would be required for a full cover of worthwhile articles each year. The film on each cassette can be reproduced for £1.50 with a cost of 50p for the casing, or a complete year's cover in full of the worthwhile articles on the construction industry, based on a world survey, could be made available for each of the DOE outstationed libraries on a run-on basis at £8 per library. Further, the cost of storing this amount of film would be in the region of £10 and its growth costs would be only about 30p per annum. The cost of microfilming is reasonably heavy and is estimated at £278 for a year's cover plus handling costs in the library. Basic equipment costs would of course include a microfilm reader for each outstation.

(*f*) The use of punched paper tape throughout the system for the production of catalogue cards, current awareness bulletin entries, six-monthly consolidations of references, bibliographies, and even notes on correspondence, enable the optimum value to be obtained from this system. The big saving is of course that the typing never has to be checked. There is of course the additional saving in typing time, for whereas ten different cards with full entries and abstracts can be produced from tapes every twenty minutes, the same cards would take fifty minutes of a copy typist's time. The value to a library system of the majority of mechanical aids can be realized only when the aid is used to its maximum.

4. Application

It might be of some interest to detail the costs of producing five publications, and show how this production can be rationalized.

(1) *Current information in the Construction Industry* (*CICI*) runs to twenty-four

issues per year and 2,000 copies of each issue are produced free of charge. Its purpose is, first, to provide a current awareness service, for which it selects and abstracts the more important articles, pamphlets and books from a worldwide coverage; secondly, to give information about courses, lectures, exhibitions, etc., of interest to those in the construction industry; thirdly, to provide a list of films; and fourthly, to give information about new Departmental publications of interest to the DOE Construction Wing. The professional staff costs on an all-in basis for a single issue is £133.00 per fortnight. Typing costs £15.50, compilation costs £11.00, paper and printing costs £90.00—a total figure of £249.50 per issue. The cost per copy excluding postage is 12½p. Certain costs of this publication are lost in the system, as many of the items included are also required for our catalogue and thus the production of the punched paper tapes and the classification and catalogue entry time fall on the cost of maintaining the catalogue, whose main purpose is to be the major tool for the enquiry service. In an effort to provide a further cover and at the same time reduce our costs we are co-operating in some way with the library of the Building Research Establishment. The Building Research Establishment covers a range of journals which are germane to its work and fringe material for the DOE Construction Wing. A reciprocal effort is made to assist the Building Research Establishment. During a four month period, from the Building Research Establishment's selection of 150 articles in eleven journals, DOE used about thirty-five of the abstracts giving them a practitioner slant.

(2) *Construction References* has two issues per year and a print run of 850, with an annual subscription of £1.50. Its purpose is to be a desk-top reference tool for publications on the construction industry. It is a consolidation of information in Part 2 of *CICI*, plus a list of films, and includes author and subject indexes. The staff cost of this reference work has been reduced to £75.00 per copy as almost all the information is on paper tape. Typing costs have increased to £65.00 per copy owing to the size of the work. Printing and paper costs are running at £300.00, a total of £440.00 per issue. The cost per copy on a small run is 52p, an exceptionally low figure. The reason for this is the run-on costs. No charges are incurred for cataloguing, classifying or abstracting and practically nothing for checking proofs, as the main body of the publication is on punched tape. The subject index is in a standard form and is lifted from a separate publication *Information on Building*. Though this is not quite as effective as a subject index selected for each issue to suit the entries included, the staff time costs for this better alternative ruled it 'out of court'. The only extensive proof checking that has to be done is the author index.

(3) *Information on Building* is an extended UDC schedule concerned with the construction industry and includes an alphabetic subject index. Where considered necessary the schedules have been expanded. The sale price of this publication is £1.50 per copy. The cost of staff time for the compilation of this new edition was £260.00, paper and printing were £180.00 for a run of five hundred. Typing time was £11.00, which makes a total cost of £451.00, or 90p per copy. It will be noted that future costs on staff time will be reduced as decisions on UDC changes and expansions which are considered appropriate will be under-

taken as part of the general cataloguing routine. The publication itself acts as a subject index to the classified card catalogues in each of the sixty-seven libraries of the Department.

(4) *Reprint Series* consists of articles in the professional press by Department staff. The print run varies according to the article, its topicality and importance but is never lower than two-hundred and fifty copies. The charges incurred are about as low as it is possible to get as they are 'run-on' costs from the journal which printed the original version, plus a note regarding the Department, and the whole stapled by the printer into a printed folder provided by the library. The manilla folder works out at a small fraction of a penny per copy. The reprint of 'New home for the Household Cavalry' (a description of the building of the new Knightsbridge Barracks) cost £20.00 for 250 copies or 8p per copy. The 'Embassy Rome', a rather larger reprint in colour, cost £188.00 for four hundred copies or 47p per copy. This is a high cost but was for an exceptional article. The advantages of this type of publication is that in the Department there are experts on practically every aspect of the construction industry. Their work is written up in the professional press and it is of value for our own very scattered staff to keep them in touch with technical developments in the work of the Department. Further, from time to time when it is wished to publicize aspects of the Department's work, a reprint is one of the cheapest ways of doing this. Finally, from a library viewpoint, reprints form useful exchange material for libraries overseas.

(5) *Metric Bibliography* was produced during the period of the metric change when new editions of this publication appeared every six months and amendments every two months. Now that the change in the construction industry is complete the last of two annual editions has been issued. The 1971 edition had a print of 10,000 copies. The library staff costs for its compilation were £260 plus £222 for a panel of experts covering the major professions in the construction industry, who acted as advisers. Typing time was £30.00 and printing and paper £1,000.00, a total of £1,512.00 or just over 15p per copy. The purpose of this publication was twofold—to assist our own staff with the metric change and also to assist the industry.

Early editions were given away, but the 1972 current and last edition is priced at 50p. A check through this publication will show that with the help of advisers the number of entries in each section has been kept down to the minimum, but a very considerable amount of supporting information will be found in the annotation. For instance, under the Institution of Electrical Engineers' *Regulations for the Electrical Equipment of Buildings*, there is a description of the changes in recent editions of the IEE Regulations and mention is made of changes that have taken place with the introduction of SI Units, as well as metrication, in a publication which since 1966 continues to be known as the fourteenth edition. This note *also* forecasts the production of future editions in conjunction with the British Standards Institution's proposals for the metric editions of their relevant publications. This amount of information under each entry is very time consuming to write and the only way in which these costs have been kept low is by gradually building up the information since the first edition was issued in 1967.

From both a library costing point of view and the availability of staff time, it is an advantage to start in a small way and build up the information quota over as long a period of time as possible. Again the use of a percentage of work done for other library purposes, for example, the classification, many of the abstracts from *CICI* and the use of punched tape, cut the compilation costs.

The 'tie in' of work in a library can be planned so that the maximum value can be obtained from each process. If instead of thinking of classification as a separate and isolated process, cataloguing as another, abstracting as a third, the distribution of copies of publications a fourth, etc., we link these together into a general work flow, all the information required can be produced on punched paper tape, and a multipurpose entry provided. By the inclusion of stops in the tape a variety of entries become available. The link between *Current Information in the Construction Industry* and *Construction References* has been shown and a further development is the use of *Construction References* as a printed microfilm index combined with an abstracting service, to provide our outstationed libraries with a full cover of world literature on construction at the lowest possible cost. The value of spreading the costly process of building up extensive notes and abstracts in a continuing bibliography over as long a period as possible is stressed.

The value of the DOE library's current awareness service *Current Information in the Construction Industry* is to provide the Departmental staff with the information they need, but it also has a number of spin off services, for it is of value to the construction industry as a whole who are increasingly prepared to pay for it. It provides our colleagues in outstationed libraries with a guide to the more important new literature on their subject so that they may build up their stock, bearing in mind local needs of professional and technical staff served. It acts as a partial printed union list of holdings to facilitate loans. Through a code reference on appropriate entries it enables foreign construction industry libraries and research centres to have a list of the major British references on the Construction Industry and in exchange abstracts of foreign material on a world basis are received.

Conclusion

These references to a few of the ways the Government library service is trying to obtain the maximum cost benefit from its work have been slanted to the construction industry. This type of work is of course carried out by colleagues in all other Government Departments, many of which have been able to develop their resources more fully than those described above. The process of maximizing benefits from the library service is a continuing one. It is continuing because government libraries are constantly changing to cover the changing needs of their Departments. It is a continuing process to ensure that new ideas and new systems which will benefit both our libraries and those that use them are never overlooked.

BIBLIOGRAPHY

There are many more references on this subject but the following have been of interest to the author.

BATTEN, W. E. External information services and the small user. *Aslib Proceedings*, **23**, 10, Oct. 1971, p. 536–40.
BROOKES, B. C. Photocopies and periodicals; cost effectiveness in the special library. *Journal of Documentation*, **26**, 1, March 1970, p. 22–9.
BURKHALTER, B. R., *ed. Case studies in systems analyses in a university library*. New York: Scarecrow Press, 1968.
CARTER, F. *and others. National document handling systems in science and technology*. New York: Wiley, 1967.
CAWKELL, A. E. Attitudes in promoting and using external SDI services. *Aslib Proceedings*, **23**, 10, Oct. 1971, p. 541–3.
DESMOND, W. F. *and* BARBER, L. A. *Indexing and classification—a selected and annotated bibliography*. Oak Ridge National Laboratory, NP 15937, 14th May 1966. Though there is a cover of 635 references only seven cover the costing of an indexing or cataloguing service.
DODGE, M. *Indexing and quering in ACM professional development seminar on information*. New York: Association for Computing Machinery, 1968.
DOUGHERTY, RICHARD M. *ed. Colorado Academic Libraries Book Processing Centre: study*. *Library Resources and Technical Services*, **13**, 1, Winter 1969, p. 115–41. Collection of three papers describing time study methodology, analysing acquisitions and cataloguing costs and cost analysis studies in libraries. Is there a basis for comparisons?
DOUGHERTY, R. M. *and* HEINRITZ, F. J. *Scientific management of library operations*. New York: Scarecrow Press, 1966.
DURHAM UNIVERSITY. *Project for evaluating the benefits from university libraries, final report*. Durham: University Computer Unit, 1969.
GILCHRIST, A. Cost effectiveness. *Aslib Proceedings*, **25**, 9, September 1971, p. 447–505.
——. Work study in libraries. *Journal of Librarianship*, **2**, 2, April 1970, p. 126–38.
HENDERSON, M. A. *Evaluation of information systems: a selected bibliography with informative abstracts*. Washington: Government Printing Office. NBS Technical Note 297, 1967. Eleven references to costing out of 154.
HOFFNER, RALPH M. Economics of national automation of libraries. *Library Trends*, April 1970, p. 448–63.
KENNINGTON, DON. Managing effectively: some tips for special libraries. *Aslib Proceedings*, **23**, 6, June 1971, p. 287–91.
KLINTØE, KJELD. Cost analysis of a Technical Information Unit. *Aslib Proceedings*, **23**, 7, July 1971, p. 362–71.
LANCASTER, F. W. Cost effectiveness analysis of information retrieval and dissemination. *Journal of the American Society for Information Science*. Jan.–Feb. 1971, p. 12–27.
LANDAU, HEBERT B. Cost analysis of document serrogation. *American Documentation*, **20**, 4, Oct. 1969, p. 302–10. A literature survey under the headings: availability, general cost elements, relation of serrogation to overall document handling costs, and specific cost factors for serrogation systems.
LINE, MAURICE B. Cost of classification. *Cataloguing and Indexing*, 16, October 1969.
PETERMAN, E. Study of the cataloguing costs in the Waldo Library, Western Michigan University. *Library Resources and Technical Services*, **14**, 1, Winter 1970, p. 63.
PLUMB, PHILIP W. Cambridge University Library Management Research Unit, *Library Association Record*, **73**, 10, Oct. 1971, p. 187–8.
ROBINSON, F. Problems of using external services for retrospective search. *Aslib Proceedings*, **23**, 10, Oct. 1971, p. 523–6.
SMITH, G. C. K. *and* SCHOFIELD, J. L. Administrative effectiveness: times and costs of library operations. *Journal of Librarianship*, **3**, 4, Oct. 1971, p. 245–66.
URQUHART, JOHN A. *and* SCHOFIELD, J. L. Overlap of acquisitions in the University of London libraries: a study and a methodology. *Journal of Librarianship*, **4**, 1, Jan. 1972, p. 32–47.
WESSEL, C. Criteria for evaluating the technical library effectiveness. *Aslib Proceedings*, **20**, 11, Nov. 1968, p. 455–81.

WESSEL, C. J. *and* COHRSSEN, B. A. *Criteria for evaluating the effectiveness of library operations and services. Phase I, Literature search and state of the art. Phase II, Data gathering and evaluation.* Washington: John I. Thompson & Company. AD 649468 (Atlis Report Nos. 10 and 19, 1967 and 1968).

WILLIAMS, G. *and others.* Library cost models owning versus harrowing serial publications. Washington: National Science Foundation, 1968.

WOLF, J. N. An introduction to the study of cost effectiveness in information systems. In: *Storage and retrieval of information: a user-supplier dialogue. Proceedings,* 18–30 June 1968. Neuilly sur Seine: NATO Advisory Group of Aerospace Research and Development, 1968. OSTI and OECD study into the economic aspects of information systems.

Research by Aslib into costing of information services

B. C. Vickery

Assistant Director (Research), Aslib

Paper presented at an Aslib Engineering Group Conference on 'Costing library and information services', 25th–27th February 1972.

THE INTEREST of the Aslib Research and Development Department in economic aspects of information service reaches back to the early days of the Department, under the leadership of Chris Hanson. I will be referring to a study of standard times made in 1961 by Margaret Slater and himself. He also undertook an investigation, which was unfortunately never published, on the cost of interlibrary borrowing. Our current interests spread over five areas are:

–exploring techniques of detailed costing
–establishing standard unit costs
–developing standard ways of presenting costs
–studying problems of cost-effectiveness
–struggling with the problem of cost–benefit.

In thinking about costs it is helpful to bear in mind that work in an information system can be analysed into a succession of narrower levels, for example:

Level 1: Library system
2: Operational subsystem
3: Book processing
4: Cataloguing
5: Entering (catalogue details on worksheet)

Pauline Thomas of Aslib has developed a detailed hierarchical anaysis of library operational procedures.[1] The overall cost of a library may be easy to determine from its budget. The cost of a detailed task such as 'enter' can be measured. To build up task costs so as to cost intermediate levels is not always easy. Let me begin at the detailed level.

Measuring labour costs

Costs may be classified into those arising from labour, materials, equipment and overheads. I will first concentrate on labour costs. The problems here are (a) to measure the labour time expended on a job, and (b) to translate time into cost.

There are at least five ways of obtaining estimates of time spent—work measurement techniques—that we have used.

Sometimes, *existing records* kept by a library or information service are sufficiently detailed to permit estimates to be made of time spent on different jobs. In a large library, the assistants may be allocated to a series of tasks by rota, and the rota schedules over a week or a month can be analysed to show the total labour allocated to each task. Such data are likely to be available, if at all, only at level 4. It is also likely to overestimate time spent on such tasks as are recorded, since minor jobs that get fitted in will be included within time spent on the major task.

Whether or not such records are available, time estimates can also be obtained by *interviewing* staff, trying to identify all the tasks that each undertakes, and getting estimates of the daily or weekly time spent on each. Such data are likely to be more reliable for staff working on relatively few and well-defined jobs. A development of this technique is to provide each member of staff with a list of his identified duties, and to get him to fill in a *work-diary*. On this, day by day or hour by hour, he fills in the actual or estimated time spent on each activity. If any activity can be readily expressed in units (e.g. books catalogued, loans issued), the number of units handled can also be recorded, providing data towards the estimation of unit times. Rather than continuous recording, *activity sampling* at random times can be carried out—either by the staff member himself, or by an unobtrusive observer.

A fifth method of work measurement is *time study* (repeatedly observing an operation, stop-watch in hand). This is most useful for short-cycle manual or clerical tasks, such as book issuing, photocopying or card filing. It is much less applicable to a task spread over a period of time or one in which intellectual decisions are being made.

By the use of these methods one can establish that, on average in a particular system, it takes thirty minutes for an abstractor to prepare a worksheet containing bibliographical details, abstract and index headings for an article. Suppose that (excluding meal-breaks) the abstractor works seven hours a day: one might expect an output of fourteen abstracts a day, but records show that, over a week, an average of only twelve a day is maintained, and over a 260-day year, only ten a day. The first drop is due to work time not productively spent (setting up work, attending to personal needs, accidental interruptions), and the second drop is due to absence from work (holidays, sickness, training, etc.).

So to move from measured time to average cost requires an estimate of the available productive hours per year. There are various ways of doing this. One method is to use a standard figure for productive hours per year. The standards used range from 1125 to 1600. If we take 1350 as a reasonable figure, the true cost of an hour's productive work is annual salary cost divided by 1350. Annual salary cost is of course salary plus superannuation, employment tax, fringe benefits, etc.

All too often in library literature we get bare cost figures quoted, such as: 'on average an abstract costs £1.25'. But since we do not know (a) exactly what work is included in 'an abstract', (b) what is the salary cost of the abstractor, (c) what measure of productive hours has been used, and (d) whether overheads have been included, it is almost impossible to use such a figure to compare with others. If labour costs are to be quoted, we need the basic data (labour time) and the method of calculation to be stated as well.

Standard unit times

Standards are useful for two purposes: the individual system manager can compare his performance against the standard; the system planner can predict the staff needed to get through a known volume of work.

As already mentioned, Hanson and Slater some years ago surveyed library literature and experience on the work output of staff. They published a set of standard times on the processing of books, journals and articles.[2] More recently, Rose Reynolds has compiled a selective bibliography on costs, times and other measures.[3]

If one collects data from different services on the average time spent, say, making an abstract, there is a good deal of variation. Is this due to differences in just what work is included in 'making an abstract'? Or again, is it due to variations in the quality of the work (e.g. length of abstract)? To explore these questions it is necessary to analyse work activity very finely, at level 5 in the hierarchy mentioned earlier. Aslib is in the middle of a detailed study of such problems.[4]

So far we have the results only of analysing a single information service. We find that in this service the average time to abstract and index an article was 6.4 minutes (the abstracts were quite brief, so the time taken was unusually small). Variations around this average can be quantitatively explained by four variables:

p–the number of pages in the article
f–the article being in a foreign language
a–an author abstract being available
z–residual variation between abstractors.

We can in fact predict with reasonable accuracy the time that an individual article will take to abstract and index as:

$$\log t = 0.57 + 0.36 \log p + 0.32\, f - 0.12\, a + z$$

where t = time in minutes, $f = 0$ for English, 1 for foreign, and $a = 1$ if there is an author abstract. By extending such analysis to many tasks and to other services, we hope to build up a picture of standard unit times and of the variables that quantitatively affect them.

Full costs

There are, of course, sources of cost other than labour, but they are often glossed over in studies of information services. Materials costs need little comment—they can usually be readily determined from purchase and stores records.

Machine costs must be based on rental (or the purchase price written off over the average life of the machine) and maintenance charges. They bring up the problem of allocating costs. If a machine such as a typewriter is used only for one process, then its whole cost must be allocated to that process, even if the machine is idle most of the time. If it is used on two or more processes, costs can be divided proportionally to (a) the time it is working on each process or (b) the output it produces for each process.

Overheads include administrative and service costs. By administrative costs are meant those created by staff time not directly expended on a process, but arising from its administration (a proportion of the immediate supervisor's time, and perhaps of staff higher up the line; also recruitment costs). The administrator(s) involved will be responsible for more than the process being costed (otherwise they would be included in its direct labour costs). Their salaries may be divided between the processes they supervise according to (a) the staff time directly expended on each process, (b) the direct labour costs of each, or (c) the labour, machine and material costs of each. These three possible methods may clearly give rather different results if machine costs are substantial.

Service costs include accommodation rents, rates, insurance, heating, lighting, telephone, postage, and a proportion of any general office services that may be provided to the information system as a whole. If a particular process incurs a disproportionate expenditure on one of these—e.g. a lot of space, much electric power, excessive use of telephone or post—it may be necessary to cost its services separately. But often the total service costs of a system can be determined, and allocated to each process by one of the methods used to allocate administrative costs.

It is evident that there are many alternative ways of calculating and allocating overheads. All too often, information service managers have little knowledge or understanding of overheads, and there is no standardization in their handling.

This is equally true if we want to cost services rather than just processes. The input processes of a given system—acquisition, cataloguing, abstracting and so on—may all contribute to a series of services, for example, a current awareness bulletin, cumulated indexes, a retrieval system used in answering queries. The true cost of a bulletin is not only the cost of sorting entries, typing masters, duplicating and distributing. A proportion of input costs must be allocated to it—but once again, what proportion? If we are to get comparable figures from different services, methods of handling cost allocation must be clearly stated.

The relation of costs to effectiveness and benefit

By 'effectiveness' we understand the measurement of how well a service to users achieves its objective. By 'benefit' we mean some monetary measure of the value to the user of the service received.

Aslib has long been interested in measuring effectiveness. We were associated with the Cranfield projects to measure the effectiveness of retrieval in terms of recall and precision, and have used these measures ourselves in evaluating information services. In 'cost-effectiveness' studies one is exploring how changes may be made in a service so as to increase effectiveness without increasing costs, or so as to reduce costs without reducing effectiveness.

An example of this is to be found in a current research study. We are examining the ways in which a specialized information service might extract references from the major computer services. We have taken the references actually selected by a special information centre over a year, and are examining each major service to determine (a) what proportion of the set it covers, (b) how the subset might be extracted by subject search, and (c) how the cost of the search could be minimized. As an example, consider the *Science Citation Index* source tapes. As you may know, the search terms used in an *SCI* profile are charged at different rates—the more frequently a term occurs in article titles, the higher the charge. We are trying out various profiles, seeking to maximize recall and precision at a fixed cost ceiling, and hoping to produce some general rules for doing this. We have also been searching the same tapes on-line, and have developed a formula to predict the cost of a search, which is a function of:

–the expected output from a term (related to its frequency in the file)
–the length of a term (number of characters)
–the number of terms summed in OR logic
–the nature of the AND logic.

As far as 'cost–benefit' is concerned, we cannot claim to have made any advances. Benefit to users has been related to the time saved by an information service. This saving of time has been estimated by:

(a) measuring the time expended when using the service, compared to that which would be spent using an alternative route to the required information;
(b) asking the user to estimate how much time the existence of the service saves him.

These time estimates are then translated into money terms via salary costs, just as in labour cost measurement.

Aslib has not so far undertaken studies of this kind, although some years ago Martyn[5] made a rough estimate of the cost of research unintentionally duplicated because existing information was not located.

Conclusion

I have tried to give you an outline of the economic aspects of information service in which the Aslib R & D Department is actively interested. As a routine, we try to collect any economic data that become available, whether they are concerned with card filing or computer processing, and we are always very glad to discuss these matters with Aslib members.

REFERENCES

1 THOMAS, P. A. *Task analysis of library operations.* London: Aslib, 1971. Aslib Occasional Publication No. 8.
THOMAS, P. A. *Procedural model for the use of bibliographic records in libraries.* London: Aslib, 1970. Aslib Occasional Publication No. 4.
THOMAS, P. A. *and* EAST. H. *Use of bibliographic records in libraries.* London: Aslib, 1969. Aslib Occasional Publication No. 5.
2 *Does your firm need its own information service?* OECD, 1962.
3 REYNOLDS, ROSE. *Selective bibliography on measurement in library and information services.* London: Aslib, 1970.
4 ROBERTSON, S. E. and others. Standard costing for information systems. *Aslib Procs.* **22,** 9, Sept. 1970, p. 425–7.
WILKIN, A. and others. *Standard times for information systems.* To be published.
5 MARTYN J. Unintentional duplication of research. *New Scientist*, **21,** 1964, p. 338.

Financing a library/information service by operating a cost recovery system

J. Cook

Chief Librarian, Elliot Flight Automation Ltd

Paper presented at an Aslib Engineering Group Conference on 'Costing information and library services', 25th–27th February 1972

1. Introduction

RECENT events resulting from mergers, takeovers, etc. in industry have clearly indicated that libraries and information units cannot continue to exist by divine right but must justify their existence as viable, essential and economically balanced units. Varying circumstances determine which methods are to be adopted to achieve this and the method described in this paper is not put forward as being possible under all circumstances but as a system operated successfully in the environment of my own company. It should be emphasized that it is not a theoretical view but a practical demonstration of applying a system which has been accepted by management and has survived two merger operations between this company and others.

It is expected that many librarians/information officers will not agree with me; in fact it has been said to me personally: 'It sounds all right and no doubt works in your sphere but I would not care to have to live like that.' It is because of the controversial aspects of this paper that it is being presented and whilst many will criticize it, I am sure that all like to feel they justify their existence, no matter what methods to achieve this are used. There may be those who are not called upon in this manner and I have indeed met some who are opposed to the idea that we have to go on proving our worth, but I firmly believe that in industry at any rate, we will be called upon to do so.

The information centre is as important as any other department and if we want recognition in this respect, we must expect to be budgeted and costed like any other department. Mr Jim Slater, the chairman of one of Britain's biggest industrial investments companies, writing in *The Director* for August 1970, makes what I consider to be a relevant observation when he states: 'The animals who learn to climb trees when the water is rising—they will be the ones who survive. There are still quite a few who don't know how to climb trees.' Cost recovery is not operated to make profits at the expense of company overheads but to achieve what it states: 'recovery of monies expended to a break-even point.'

2. Company organization

It must be admitted that the internal organization of a company can facilitate cost recovery or make it difficult. I will briefly explain a company administration and trust that it bears some resemblance to your own internal organization. If it does not resemble it at all, it could be that at least some of my remarks will be helpful even to you.

The company is headed by two joint managing directors (see Fig. 1) who are assisted by certain non-line management in the form of joint general managers and assistant general managers. Next come the management services, for example, personnel, marketing, productivity, commercial department, etc. After this we come to our first in-line management responsibility below that of managing directorship. These are the manufacturing divisions, each managed by a divisional manager. Each division is autonomous and is virtually staffed and administrated as a separate company. Out of its profits it pays a levy to top management and its services.

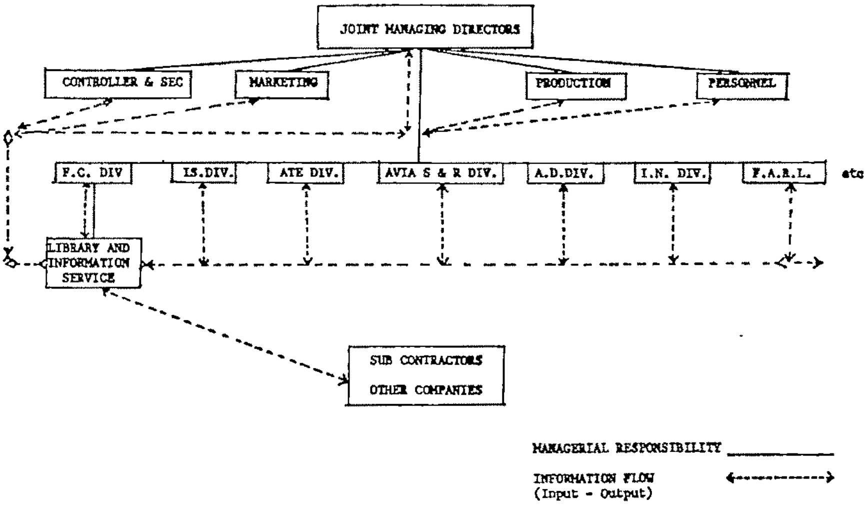


FIG. 1: *Organizational chart*

It will be noted that although the library/information service is responsible for dissemination of information to management as well as to divisions, it is located in one of the manufacturing divisions and is administered by that division. This is (a) because the service needs a banker to put up money prior to recovery and (b) because a manufacturing division has existing services which enable it to give administrative support to the library, whereas top management have not. Incidentally, the information service not only disseminates information to top management and all divisions, but has inputs of all facets of internal information from all these sources. The definition of a manufacturing division is in fact a group of people who hold contracts for certain specified products and the manufacture is covered solely by such a group of people from the design state through production, test and sales.

3. Compilation of the budget

About two months prior to the issuing of a new budget, a meeting takes place between the budget officer and the chief librarian. Two figures have to be arrived at:

(a) the total indirect expenditure estimated to be incurred;
(b) the hourly rate for library charges to enable 100 per cent recovery of the indirect expenditure to achieve a break even point.

(a) *Total indirect expenditure*
It is important to know what we mean by this figure and in fact it is to be the absolute total money to be spent on library services during the forthcoming year. It is based upon the previous year's expenditure plus a percentage allowance for price and wage increases and the expected expansion rate. (The expansion rate is estimated by the chief librarian.)

The purchase of hard copy is listed separately because it is off-loaded as such to customers, whilst all other expenses will be recovered by the determined hourly rate charge. This is done to enable divisions to vet their requests easily and because the raw materials figure can fluctuate to a great degree.

As a guide I list the headings under which we group the indirect expenditure.

Wages
Car & travel allowance, entertainment
Hired equipment
Maintenance
Personnel costs
Purchased services (inter-company, data processing, etc.)
Telephones
Postage
Floor space
Gas/water/electricity
Stationery/publications
Security
Insurances
Purchase of materials
Education/training
Visits
etc., etc.

In addition to these, an allowance must be written in to cover sickness, usually around 10 per cent. Care must be taken when assessing the recovery rate to allow for holidays: only actual workable hours can be counted.

(b) *The hourly rate*
When you are sure that you have allowed for all contingencies and know the expenditure figure, you can begin to think about recovery. As we are able to reclaim expense under labour and materials, we must separate out the expenses accordingly into (i) material costs, and (ii) labour costs (everything other than materials).

After totalling the expenditure you will arrive at an overall figure. The first thing to do is to subtract the materials total from this. Next you must decide how many operatives are to be used to enable you to recuperate the remaining amount. All staff may be included or you may decide to leave some out. We leave out the chief librarian and the secretary. It makes no difference in the long run to the customer because in our view less operatives charging time means a higher rate per hour but less hours charged. Another advantage is that there is the machinery available for manœuvring if this becomes necessary as a result of circumstances not known or anticipated at the time of assessing the budget.

If you decide not to use all your available time, the unclaimed hours must be deducted from the total available to be used for recovery purposes.

You need not, if you so desire, allow for sickness, absence through training etc., until you know the labour availability in hours. If you do then whatever allowance you make must also be deducted from the remaining balance of hours available to ensure cost recovery. You are now left with a total liability and a number of working hours. It is a matter of applying simple arithmetic to enable you to determine how much per hour you must charge to recover the outstanding balance. The following tables will illustrate the final stages of formulating the chargeable hourly rate based on a staff of fourteen of which twelve are to be used as recovery operatives working on a 37½ hour week for fifty-three weeks (1971) where the figure to be recovered has been ascertained at £36.910 and the amount of money spent on materials is estimated to £6.519.

		Hours
No. of workable hours	14 × 37.5 × 53	27,825
Chief librarian and secretary do not book their time, therefore the figure is	12 × 37.5 × 53	23,850
Less 10% holidays and sickness		2,385
Workable hours available		21,465
Less courses and training		200
TOTAL AVAILABLE WORKING HOURS		21,265

Gross overheads	£36,910	
less materials	6,519	
Overhead to be recovered by workable hours	£30,391	
Cost recovery overhead	$\frac{£30{,}391}{21{,}265 \text{ hours}}$	= £1.43 per hour

4. Operating the cost recovery system in the working environment

Having decided that you now have a chargeable rate which will give you a break-even return on your expenditure, it naturally follows that the department has to be organized to achieve this objective. We do not want too much paperwork and we do not want the operation to become too time-consuming. The answer is, ***keep it simple.***

In our information department, we use three printed forms for recording time consumed and materials purchased. These forms are so designed that they can be photostated when completed at the end of each month and used as cost off-loading sheets. They are:

(i) The labour analysis sheet
(ii) The materials analysis sheet
(iii) The time sheet.

The labour analysis sheet gives details of document reference number, number of copies, action taken, time consumed, operator's name, and document holder or customer's name. These forms are maintained by the information assistant who makes the entries at the end of each task, and there is a separate form for each chargeable departmental number. At the end of the month the hours are totalled and entered on the time sheet as a gross figure against the respective charge number. The time sheets go to the cost department who raise an internal charge note against the numbers at the appropriate rate and the money is credited to the library and information department.

The analysis sheets are available to divisions so charged, upon request, to enable them to vet their charges in terms of value for money.

The materials analysis sheet gives details of document reference number, invoice date, cost incurred and authority for purchase. These details are taken from the orders and invoices as they are cleared for payment. There is a sheet for each chargeable number and this exercise is carried out by the library secretary.

At the end of each month, the sheets are totalled and a copy is made on the Xerox machine. One copy is forwarded to the cost department which makes out the necessary inter-works transfer notes. The transfer notes together with the copy of the materials analysis sheet are sent to the customer being charged; he is then able to vet his costs as he does with the labour analysis sheet. A second copy is retained in the Library as a record. We find that once personnel are initiated into keeping these forms up to date as part of the immediate task on hand the time taken is negligible. The recording must not be allowed to accumulate and thus become a large chore.

About 60 per cent of the department's work has a black and white definition and times are easily assessed, but it will be understood that there are certain grey areas where it is not feasible to record each task. One example is the loans desk.

For such areas, we have introduced what is known as the standard cost sheet. These sheets are issued under the signature of the chief librarian and allocate time in proportion to usage to each chargeable number. These times are merely copied on to the operative's time sheet at the end of the month.

The standard cost system can only be effectively applied if there are suitable records to enable the compiler of the sheets to measure their accuracy. We re-assess every three months and, where necessary, change the amount of time charged in accordance with the usage trend indicated. This is acceptable to customers once they are informed of the system adopted for vetting the allocation of time. Time is never booked against the library/information department's number unless it refers to sickness or holidays—times which have already been catered for in the budget.

Monthly returns against the budget are sent by the accounts department to the library and act as progress reports. If charges get out of line there is ample warning and adjustments can be made. This saves the library the trouble of keeping books.

5. Reference material and maintenance of library stock

Provision has to be made for the financial support necessary to the preservation of reference materials and a reading area, and journals and books have to be bought for library display. This is where management services, which hitherto have remained on the sidelines, begin to play a larger part in the operations.

Agreement is reached with the management budget controller for the financing of this side of the business because management have decided they wish to have such facilities made available. Management do not allocate a fixed sum, but agree to accept charges up to an agreed figure and this figure is usually sufficient to support a library at the desired level. Should individual members of management services request items for permanent loan they have to pay from department budgets and such charges do not affect the previously agreed sum. Management's cost department is of course notified of all items purchased and off-loaded to the account in exactly the same way as for the divisions.

The working documentation ordered for technical library shelves is purchased and maintained by sharing the cost equally amongst the manufacturing divisions. When this is done the labour and material analysis sheets state the details as such. This enables the information officers to be forward looking and to broaden the field of available knowledge in the light of estimated future requirements.

6. Performance measurement

(i) All divisions and management personnel deal with the library on a voluntary basis. They are permitted to go elsewhere if they can get a better deal. If we maintain our customer relationship or indeed increase it, this in itself is proof of our effectiveness.

(ii) Sufficient information is given to a customer's management to enable it to vet the amount of money being spent on what, and by whom it is spent.

(iii) Expansion or contraction of library expenditure will automatically adjust itself in line with the business fortunes or otherwise of the manufacturing divisions. The less they request, the less are the charges made.

(iv) Proof of viability or the right to exist is an automatic occurrence each month. The off-loading figures, together with the type of information accompanying it which is submitted monthly, is agreed by customers. If it is queried at all, it is possible to give a satisfactory explanation.

(v) The library is not likely to overstaff because it would be cutting its own throat if staff were employed who could not be deployed profitably. Remember, a time sheet has to be filled to capacity by economically proven working hours. Overstaffing would be a self-inflicted act of sabotage and end in obvious disaster. Growth which overloads staff below 37½ hours weekly, is taken care of by working members of the existing staff on overtime, or if permitted, you could employ temporary staff on the number of hours justified.

7. Concluding remarks

Where management are prepared to acknowledge the necessity for library and information services, to the extent of financing them without the introduction of the type of cost awareness that has just been described, then this is their choice and they no doubt have their reasons for preferring it so.

It has been made evident in recent years, however, that many libraries disappeared who might have survived had it been possible to offer some alternative means of justification for doing so.

This system is offered not as the only alternative, but a possible one. Working to the system described has proved advantageous in many ways at this establishment. For instance, it was responsible to a great extent for the extended control we gained over 'in-house' expensive document circulation. Most basic manuals or instructions, whether they be produced by management or a division, are circulated and charged out by the library. This is because we have an effective costing and charging system. These documents are sold to the library who re-sell them at cost, plus circulating charges, thus avoiding expensive circulating staffs being employed in other areas. In this way one's prestige can therefore be enhanced.

One thing is certain: we must not become complacent. Those of us who feel most secure should be ready at all times to justify our existence as a good, viable, essential service and a necessary instrument which has been designed to assist technicians and industry to be competitive.

It was at the Feast of Belshazzar which was held to celebrate the achievement of Power and Riches, that we are told, and I quote from The Book of Daniel, Chapter 5:

> They drank wine and praised the Gods of Gold and Silver, of Brass, of Iron, of Wood and Stone.
>
> In the same hour came forth fingers of a man's hand and wrote over against the candlestick upon the Plaister of the wall of the Kings Palace and the King saw the part of the hand that wrote.
>
> This was the writing that was written:
> MENE–MENE, TEKEL, UPHARSIN.
> Daniel interpreted these words as follows:
> 'God hath numbered thy kingdom and finished it
> Thou art weighed in the balances and art found wanting'.
> Another word PERES was interpreted thus:
> 'Thy Kingdom is divided and given to the Medes and Persians'.

We must see to it that should the writing appear on the wall for us it reads somewhat differently. It requires for one word to be changed from each verse of the original quotation:

(i) God hath numbered thy Kingdom and *condoned* it.
(ii) Thou art weighed in the balances and found *wanted.*

It will then be less likely that the Medes and Persians will be called in and we shall, in all probability, not experience the situation that has existed in the past, where they divided amongst themselves the valuable collections that existed in some of the libraries that have been closed in recent years.

Teaching costing techniques to librarians and information scientists of the future

R. Sturt

Chief Librarian, City of London Polytechnic
(formerly Head of Department of Administrative
Studies, College of Librarianship Wales)

Paper presented at an Aslib Engineering Group Conference on 'Costing library and information services', 25th–27th February 1972

I LITTLE THOUGHT, when our mutual friend, Leslie Patrick, led me last June towards the giving of this paper on costing techniques, that my standpoint would have changed to the extent that it has. As a *teacher* for nine years in the sphere of library management or administration, as it was for so long called, my outlook had been tempered by the Library Association's policy, rigorously maintained, that library education aimed to afford the novice the broadest possible view of librarianship. This meant that the descriptive—no matter how lyrical—was *in*; the evaluative or critical—using techniques or tools—was *out*.

In fairness to the Library Association, as to yourselves, it should be remembered that the major syllabus revision of ten years ago was affected more by the claims of certain groups of librarians to have their practices given an airing than by any latent wish to allow the library student to play around with management concepts or principles. Most of you know the results of that policy if, for example, cost-consciousness is the measure that we apply to library performance today.

Now—as a chief librarian of seven weeks' standing—my outlook has been hammered by harsh economic facts. Whether it is computing the manpower and space budgets for planned growth of stock over the next few years (space, I am warned, at £7 a square foot to rent) or determining the cost basis of photocopying service, the need emerges to have at hand or up one's sleeve a battery of hard costs built up by one's own small garrison from objective data.

But, before this translation occurred, I had attempted to find out to what extent and by what means we in the library schools were teaching costing techniques. To do this I wrote to fifteen schools, including my own, seeking information about teaching programmes and materials on costing. I also asked if cost factors were considered in papers at appropriate points where comparative studies were made, as in cataloguing or processing evaluation, and invited examples of difficulty in securing cost data from libraries. My final two criteria were the response of students to any such teaching and the opportunities given students for projects or exercises in the field.

Twelve of the fifteen replied, some at length with much illustrative material and I am taking the liberty of quoting some of the replies.

Two of the twelve were to the point. One wrote: 'I find that we are not, in fact, doing anything at all about teaching cost techniques but I have thrown everyone into a fine fury of wonder as to whether they should be through asking them!' The other took me to task for pursuing my 'own little pet subject field' at a time when educational courses 'have to be broad in scope and deep in principle.' His next remark introduced the facet which I think merits some further discussion as it recurs in other replies: the longer the course is, the greater the opportunity becomes to study certain topics in depth; if more continual assessment were permitted, topics such as costing techniques may well play a greater part. He was, of course, referring to the quiet, revolutionary process in library education in which the Library Association's two-year syllabus is being replaced by the three- or four-year degree syllabus in most schools. If I may hold to that point for a moment there is a pertinent remark from one other school: 'Student reaction is interesting. L.A. course students tend to the view that this is not relevant to librarianship; persuading them that it is, is on occasion uphill work. Degree students are however much more receptive: they tackle these concepts in fair detail in the final year of the course, and having spent a year in the profession . . . the students appreciate the relevance to contemporary library administration.'

The clear-cut nature of this distinction may surprise many, but it is underlined by the experience of two schools which offer evidence of the readiness of postgraduate students to learn and apply costing techniques in projects based upon actual library case studies. There is, however, a different note struck by one school writing about postgraduate and undergraduate finals students: 'I have found that the concepts and methods presented little difficulty; nor do the notions of probability, basic algebra, arithmetic. Further, most students show a satisfying perspicacity in identifying weaknesses in mathematical models presented such as Urquhart/Buckland. However, their criticisms tend, very definitely, to be destructive, and they have little appreciation of how to go about remedying the defects of models. . . . The students' mathematical "literacy" is usually poor, and—more's the worry—this does not seem to concern them.'

So much for students' reactions. I think the conclusions one may draw from these statements are that students in the final year of a degree course or on a postgraduate course are learning cost techniques and applying them beneficially, and that the more critical factor appears to be the maturity of the student rather than the length of the course. Maturity, in this sense, does include that acquired during the periods of directed practical work in libraries.

Six other schools planned their teaching to ensure that broad management concepts, rather than particular techniques, were clearly understood by students, with the focus upon budgetary processes when illustration was necessary. No substantial teaching of costing techniques, as such, was undertaken, and the two limiting factors quoted were lack of time and the immaturity of students. It should be understood that a consensus of library school opinion in the matter of teaching management techniques was attained at Cambridge in March 1971, when, at the conclusion of a seminar organized by the Library Management Research Unit, 'it was generally agreed that at levels up to first degree, all that could be given was an appreciation and awareness of management techniques.'

As these schools receive the majority of library students it is fair to note that, within the broad policy framework, the 'awareness' is on occasion taken to interesting stages. To quote one: 'Cost factors are used, whenever necessary, in general teaching. Examples are usually forthcoming from our good friends in neighbouring libraries (although the many variations in accounting practice make it difficult to isolate the components of many so-called unit costs).' Examples on a par with those in *Management techniques with particular reference to local government*, by J. M. Rogers, have proved satisfactory in making the student aware of the technique. Other schools use building costs, to show the comparative cost per square foot, or staffing costs linked with workloads, to arrive at examples of general costings. Cost-consciousness is one thing, but, in the view of one school, the 'ability to *use* the techniques is better taught in special short courses after a few years' more experience—and then only to those who will employ them'. Is that last point, I wonder, significant to us today?

One matter about which I was most curious (and unsatisfied) was the use of costing techniques or costs as a critical factor in the examination of cataloguing processes or retrieval systems. Papers were produced, such as *Information services: measuring the cost*, by J. M. S. Risk, or *An introduction to the study of cost effectiveness in information systems*, by Professor J. N. Wolfe, but it may have been a fault in my letter of enquiry that led to the omission of any precise statement of the part they played in the learning process.

My enquiry about the degree of difficulty in obtaining cost data evoked some blunt comment: 'The problem is not mainly one of what to teach and how to teach it, but one of access to some actual cost figures; the most difficult ones to get hold of are the actual prices of equipment . . . and for consumable materials *in the UK*. What is required are regular tabulations in *Aslib Proceedings* or *LAR* of UK prices as in Hayes and Becker, *Handbook of data processing for libraries*. The second problem area is that of costing policies in various institutions.' Here were stressed the differences in calculating overheads, depreciation and allocation. A third problem in the same area was the unwillingness of institutions supplying data to library schools to permit the publication of cost studies even when the identifying clues had been eliminated. Difficulties were mentioned by one other school in comparing 'bald figures' from two or more libraries without knowledge of the total library systems. The paucity of research studies in this field was stressed by a third school, which thought any present discussion would necessarily be 'tentative' and 'exploratory'.

The final consideration arising from this small survey must rest upon the nature and quality of the projects carried out at schools. One reports that there has been a number of students carrying out systems analysis and design studies as their special study project, with several concerned primarily with costing. Another school supplies three projects and I would like to use the titles to indicate the content and context: The unit cost of circulation in the X library; Determination of the unit cost of the circulation system at X college library; The unit cost of generating one catalogue card set at X college library. They are achievements of which I feel both lecturer and students may be proud, as time limitations were severe.

To conclude on the survey—before turning to teaching itself—it may be said that there is far more attention paid to costing techniques in 1972 than ever seemed possible in 1967, that the transition from two-year to longer or later (i.e. postgraduate) studies is speeding the movement towards a greater understanding of management principles, social context, and values, and that constraints such as insubstantial cost data or undue secrecy on the part of practising librarians probably match the restraints that some library educators impose upon techniques-centred courses. Not least in our discussions should be that small but so important question in a profession which nearly drowned in cataloguing and classification techniques: to whom should we teach costing techniques?

I would like to turn now to a plain account of teaching. As this is the first occasion in this paper that my personal views appear it may help to explain an early process of discolouration, when for eight years I bore the strain of keeping books and not reading them. The raw years of my working youth were spent in devising costing systems for two local authorities and, by maintaining rigid controls over expenditure analysis, it was possible to produce a range of unit costs which must at the time have been as startling to those who took decisions as they were unpredictable to me. One I remember was the cost of replacing panes in windows on Council estates. The results were shattering, too. When you realize that such work was carried out by elderly, semi-skilled men whose propensity for teabreaks was matched by that of the housewives, whose very proper concern to repay such kindness found expression in doing all the odd jobs on gate latches and doors unrecorded, and whose materials were for ever being shipped by a dog-like lorry, the value of the unit cost per pane—no matter how correctly computed—was no more real than the workrate of the workmen. They *did* work hard, and effectively; but, with time units of fifteen minutes, no minor jobs were recorded even if they were legitimate. Standard costs *were* attempted, for example the cost of scarifying a square yard of road surface; but one brave attempt to establish, for comparative and retirement purposes, the cost per mile for each vehicle reached a tricky point when it was discovered that a petrol pump at one depot actually *made* gallons of petrol a month by giving short measure. The effect of such a freak condition upon our figures can be imagined, but that was the major difficulty: ensuring that conditions were stable. We measured *operations*, and it would not, I am certain, have occurred to us to measure or quantify any aspects of *service*. It was, therefore, several years after becoming a librarian that the possibility of arriving at more precise costs occurred to me for those areas of our activity that could be isolated from 'service' connotation. This was in the 1950s, and I wrote to the LA and discovered the names of the other two librarians who shared my notion. We also discovered that two municipal treasurers—living miles apart—had prepared some material on costing library services. It was a brief and fruitless encounter; our best endeavours, as far as we could see, would bring us only to the fringes of any effective cost policy for a library when so much of what was spent—and the manner of its spending—was determined by arbitrary, inconsistent and often extravagant decisions taken in the name of service.

One incident in that period remains in memory. I was determined to use precise general costs where I could, and, as I wanted a wall-hung map unit, I wrote for details of one described in a library journal. I pressed the obliging librarian hard for exact costs for this thing that hung out sheets and sheets of 1" maps. Back it came with a specification, a drawing, labour and materials costs: all admirably tabulated. Neatly written along the bottom was: 'The wall fell down, and had to be re-built.' I have never had a wall-hung map unit.

Today—or last year—as a lecturer, the need to teach costing techniques to young people who, in current parlance, would go into middle management, loomed less large than the need to engage them critically in the study of people in the library (personnel management and reader relations) and of the overall planning of systems. My judgement may have been influenced by my knowledge of the cost of mounting and maintaining effective costing systems; an example of what I mean is given in that rather curious publication, *A report on the use of costing and other financial techniques in technical colleges, 1969*, where, after some fourteen paragraphs explaining and examing a unit cost basis, using the course as the unit and, by division, producing a cost-per-course-student, the Report runs:

> A costing exercise on these lines would be theoretically possible, and, if methods of apportionment of indirect expenses were specified, cost comparisons could be made between colleges. The results obtained would certainly be of interest, but it is doubtful whether the the cost of producing them could be justified.

It goes on:

> Financial control and cost-conciousness could be enhanced both by less ambitious costing exercises within colleges and by the publication of national figures of average costs. The possibility of sophisticated industrial-type costing will therefore not be pursued. . . .

It is difficult, in my view, to arrive at that kind of decision without far greater knowledge and experience of management situations than we are able to project in the classroom or seminar, even with case studies and exercises to help us. A technique is a tool used towards the attainment of an objective. A prerequisite to the use of a tool is understanding of the objective for which the tool is selected. It is that understanding, managerial understanding—insight if you like—which we should be trying to inculcate, to a greater or lesser degree, in the process of library education. There is a danger that competence in the use of techniques, without managerial insights, will lead to a negative or destructive attitude, as has been previously stated by one of the library schools. 'They have little appreciation of how to go about remedying the defects of the model. . .'.

Let me sketch the lecturing programme in order that you may hang your criticism upon it or part of it. I would like to insert a background note. Apart from two major postgraduate institutions the library schools in the main are providing courses in tandem: the Library Association in one seat, a university or CNAA in the other. With some rapidity (and agreement) the two are changing places. The LA is now—as an examining body—taking the back seat, and the library schools are in the steering seat, and choosing, within a local academic structure, the direction the courses will take.

The effects are important in this sense. Studies prepared by individual students are becoming increasingly accepted for assessment as a major element in the examination of that course. Thus, student projects—the study of a topic in depth and at length—are moving into fields where we scarcely put a foot before.

In this changing climate of the past few years there is not only individualized study, on projects, but new variants of traditional courses and also newer ways of learning, such as case studies, simulation and other exercises.

Management is divided into the five elements beloved by Brech, Fayol and Drucker: Planning/organizing/motivating/controlling and innovating. Planning includes financial planning, but in the main the element of controlling brings with it the study of the techniques by which control is established, such as budgeting, costing, work study and so on. The Treasury's *Glossary of management techniques* is used as an authority in the matter of definitions, with minor amendments.

The list of readings is kept small throughout the two-year course, in order to ensure availability and consistency of presentation. Activities such as performance budgeting are studied, with examples from the readings, but there is no attempt to prepare a budget by referring to particular objectives.

Costing, or cost accounting, is explained and considered in the light of various and varying statements from the readings. Direct and indirect costs are considered, and a handout assists the analysis. Unit cost is also looked at in this way, with some crude unit costs calculated, such as the cost of processing a book or of cataloguing a book. Cost-benefit analysis and cost-effectiveness are explained but there is no use of case material, and library examples of any great relevance have not yet been found, to be used.

Later in the course, when two major projects are in train, there is a series of lectures with the problems-approach. 'The problem of money' takes actual examples of money problems or inadequate financial information. The absence of costs as a limiting factor in library development—and the lack of cost-consciousness—are now considered in the light of experiences or observations from fieldwork or other situations. By simple exercises it is shown how, for example, the price of a book is related to the cost of processing it and then to the cost of making it available to the reader, to form a basis for compiling a budget that will bring the resources of manpower, stock and space, among other things, into balance.

Two of the greatest needs in teaching are the materials for case studies and authentic, detailed costings or unit costs. If as a result of this conference's deliberations a more open attitude is adopted towards financial information it will be a matter of joy to my former colleagues and some compensation for the free manner in which they have advanced information about their teaching methods—in many respects their most prized, guarded and secret possession.

Use, efficiency and cost of external information services

A. Kabi

United Kingdom Chemical Information Service (UKCIS)

Paper presented at an Aslib Engineering Group Conference on 'Costing library and information services', 25th–27th February 1972

IN THIS PAPER I will deal separately with the three main headings of use, efficiency and cost, and where possible compare them with 'in-house' information retrieval services. It would also be convenient and more realistic if we examine the above factors in terms of an existing operational service. Perhaps I will be forgiven for choosing the services offered by the UK Chemical Information Service (UKCIS) since I have some knowledge of that service. For those of you who are not acquainted with UKCIS activities, a very brief résumé seems appropriate.

UKCIS provides a current-awareness and retrospective search service using the computer-readable files produced by the Chemical Abstracts Service. All UKCIS services are based on free-text. The software package presently used by UKCIS was developed for a KDF9 machine and consists of a serial search program, a print program and a profile update program. (Our Research and Development Department is now preparing a new search program which will further improve the efficiency of searching and make retrospective searching an economic proposition.) Our search strategy allows use of simple Boolean operators and weights. It also allows for term truncation so that fragments of words can be searched for. Currently we offer our users three types of alerting services. They differ only in the form of output. The most popular service is the standard individual service, where the user receives the output in the form of 6 × 4 inch cards which contain the bibliographic references as well as other pertinent information, such as profile number, article weights (where applicable), CA abstract number, location of research and terms matched etc. The MACROPROFILE Service provides notification in the form of a bulletin giving complete bibliographic reference, location of research and CA abstract numbers (where available). The third service is marketed under the name CAREF where the user receives notification in the form of a list of abstract numbers. The cost to the user depends on the data base and type of service. The costs of the services are not insignificant, but the benefits of the service are such that about 150 users are paying for over 350 profiles on the standard service and over 120 users subscribe to our MACROPROFILE and CAREF services.

Use

Let us start by examining the type of UKCIS users and the use made of UKCIS services. UKCIS services are presently being used by subscribers from industrial and Government establishments and universities. A number of these subscribers pay for UKCIS services in spite of the fact that they have an 'in-house' information retrieval system. This may be due to the fact that external operators like UKCIS offer a wider choice of data bases and services. As far as I know, only a very few in-house operational systems process more than one data base.

Most UKCIS subscribers use the services to keep themselves up to date in their fields. Besides providing access to literature on new products and new methods, current awareness services provide stimulation for research and prevent duplication of work. Some use the service to keep an eye on the work being carried out by their competitors and also to collect marketing information. Because UKCIS processes several data bases, the user can choose the data base most appropriate to his needs and also the type of service that suits him best. It must, however, be pointed out that external services cannot provide information on internal reports of companies or company management information. For this type of information it is advisable to have an internal information storage and retrieval system.

Efficiency

The efficiency of a service can be measured in a number of ways. The most important criteria appear to be:

(1) Coverage
(2) Recall, i.e. ability to retrieve all relevant references
(3) Precision, i.e. ability to avoid retrieval of unwanted references
(4) Currency, i.e. response time of the system
(5) Time required to make use of the system.

There is, of course, another important factor, namely cost which will be dealt with separately.

For users whose interest falls in the realm of chemistry, UKCIS services provide excellent coverage. For example UKCIS services can give access to references from 13,000 journals, patents from twenty-six countries, conference proceedings, reviews etc. Since most external operators like UKCIS process a range of data bases, the user has a choice in terms of depth of coverage. This is not economically possible with an in-house operation since most internal operational services have a limited number of users for each data base, which does not allow proliferation.

In terms of performance, services offered by external operators like UKCIS can equal if not better that of in-house services. Typical performance figures are difficult to produce for the UKCIS service environment because of the wide variation in user requirements. Nevertheless, it would be disappointing if we retrieved less than 90 per cent of the references relevant to the users' interest and if less than 50 per cent of the documents delivered to the user were relevant. Since using an external service implies paying for the references delivered to the users, it becomes imperative that the service provides a high degree of pertinence without considerable loss of recall. Therefore most external operators spend considerable effort in research to improve the performance of the service. I am not implying that operators of internal information retrieval systems make no effort to improve their services. However, the economics and service commitments provide a greater incentive to external operators to improve their service. Further, most external information service operators have Research and Development staff dedicated to improving information retrieval systems.

Another important criterion for evaluating an information service is the currency it can provide. Currency is not always within the control of the external service operators. Operators like UKCIS who process data produced by outside organizations cannot influence the currency achieved by their services except in that they can ensure that data processing is done regularly and without delay. Again a service purchased from an outside operator like UKCIS can achieve this more easily since most of these external operators use dedicated computer time. It would be true to say that most 'in-house' information retrieval operators could also have similar dedicated time. Since the response time is dependent upon the smooth operation of data processing, it is important for service operators to be aware of the many things that can go wrong. Two of the most common causes of failure to provide a regular service are (a) delay in the receipt of source data, and (b) errors in tapes (like parity, missing tape header, labels, end-of-file indicators, tape formats etc.).

Besides the above, the operator must be constantly aware of the possibility that the computer or the programs used may be deficient in some way and must take reasonable steps to minimize the effect of this.

By handing over the task of information retrieval to an outside operator, one rids oneself of the awesome responsibility of maintaining a smooth operation. An 'in-house' service can certainly overcome most of the above listed difficulties, but this will require some amount of manpower. Since most internal operators provide the service to a smaller number of people compared to an external operator, manpower utilization will be inefficient and uneconomic.

Most mechanized services, whether operated internally or purchased from an external operator, require the user to expend some of his time. The user, for example, has to learn the art of programming a search strategy and he also has to check the output for relevant information. It must be remembered that computerized information retrieval is not a simple push button operation, but that the user has to be involved with the system. These systems do not reduce the amount of information the user must study; they simply find it faster and more efficiently. Users' time is spent in reading more primary literature and review articles.

These services also allow more efficient use of information personnel, enabling them to devote time to evaluating and disseminating information. By purchasing services from an outside service, the information specialist does not spend his or her time in organizing and processing queries, but instead he can concentrate on channelling the list of references he receives from the operator appropriately.

Purchase of services from an outside operator could lead to the establishment of an ideal 'trilogue' between top management, information specialist and researcher. The references retrieved will be sent to the information specialist who then scans through the card or abstracts and evaluates the information.

Information on marketing, competitors' work, new products, can then be channelled to the top management and at the same time the researcher's attention will be drawn to these. The information specialist will also devote his time to collecting feedback information from the researcher. Thus an external information supplier can enable an organization to function efficiently without excessive financial or manpower commitment.

Cost

Perhaps the most important criterion on which the services offered by an external information service have to be judged is that of cost. The cost has to be balanced against that of the same service provided by an 'in-house' operation.

In any comparison of costs one must follow strict cost-accounting procedure. One must account for all hidden costs and cost all operations realistically. 'In-house' operations like external information services should be treated as a business entity, complete with its share of customer relation, operational and marketing problems. All these problems cost money. The main operational costs can be categorized under the following headings:

(1) Machine charges
(2) Staff cost
(3) Stationery (including computer stationery) and postage
(4) Subscription payable to the data base producer for the use of data bases and the cost of postage and package of data bases for transportation.

(1) *Machine charges*

Since the CAS data tapes are incompatible with the computer used by UKCIS the tapes have to be converted. This accounts for about twenty minutes of computer time per data base. This is a fixed cost and is not affected by the number of profiles processed.

The second and largest part of the machine cost is due to the time used in producing the output, i.e. time consumed in carrying out amendments, datavet (computer checking of profiles), search, sort and print, etc. This time is dependent upon the work load. Thus an internal operator will pay more for computer time per search because he will invariably have a small work load. Of

TABLE 1: *Machine timings for a few sample runs*

Date	*Source volume issue no.*	*No. of profiles*	*No. of amendments*	*Search time (min)*	*Form print tapes (mins)*	*Print time (mins)*
28.8.71	CA 75/05	100	9	89	25	30
	CA 75/06	144	30	201	41	77
11.9.71	CA 75/07	100	13	69	20	27
	CA 75/08	139	18	204	42	70
25.9.71	CA 75/09	100	9	63	23	28
	CA 75/10	139	20	157	44	66
9.10.71	CA 75/11	80	15	60	16	22
	CA 75/12	137	14	179	35	56

course, one can increase the work load by running unnecessary profiles. Besides the above, there is a fixed machine charge which has to be paid irrespective of the number of profiles serviced. UKCIS buys machine time from the University of Nottingham at the standard commercial rate.

Table 1 gives you some indication of the run times. The figures do not include the time taken to add section numbers to the CA Condensates tapes (UKCIS searches allow selection by section numbers), amendments, data checking and feedback. The latter is useful to keep records of the computer runs and helps in the control of the operation. These amount to about sixty minutes of KDF9 time per run.

I have deliberately chosen CA Condensates, because this data base is the largest file we process.

(2) *Staff costs*

There are three types of staff costs, namely:

(a) Professional staff time
(b) Clerical and Secretarial
(c) Keypunching operations.

The professional staff time is mostly devoted to providing customer satisfaction, exploring new markets and seeking better servicing techniques. The clerical and secretarial staff are needed to provide a backing service to the professional staff and also for collating, packing and dispatching output.

Since most operators permit a certain number of free amendments to profiles, it is necessary to have backing keyboarding facilities. Keypunching can be done either in-house or sent outside on contract. In UKCIS we have our own keypunching staff, and an internal accounting system; we pay about 60p per amendment.

(3) *Stationery and postage*

Stationery costs are normally quite high. Probably the most expensive item under this heading is the computer stationery used for printing output. UKCIS normally provides output on 6×4 inch cards. Although cards are most convenient and an acceptable way of providing output, they are much more expensive than the line printer paper which is sometimes used to provide output. (Cards cost about £2.98 per 1,000 for large orders and paper about £1.00 per 1,000 sheets.) Despite the extra expense, we at UKCIS believe that in this instance acceptability must override any economic consideration.

Other items under stationery include printing (search manuals, profile forms etc.) and packing material (e.g. envelopes and jiffy bags etc.).

The mailing cost is proportional to the number of packages. We normally send all our output by first class recorded post. But for 'in-house' operation, charges for dispatch are probably not accounted for.

(4) *Subscription for data base*

This includes tape subscriptions, cost of tapes and distribution charges. Since UKCIS provides services using CAS data bases, it will be appropriate here to quote the annual subscription for these computer-readable files:

CA Condensates – £1,854 per annum
CT – £ 717 per annum
CBAC – £1,054 per annum
POST – £1,054 per annum

£4,779

(UKCIS does however have concessionary rates by special arrangement with CAS.)

Each data base is supplied on a 2400 ft. reel of magnetic tape and has to be leased at the rate of £6 per reel. Distribution charges amount to about $9.00 per issue or £98 per data-base/year. So as you can see the cost of running an information retrieval service is quite high.

Before making a decision about setting up one's own information retrieval system, it is important to draw up financial plans in terms of overall objectives (e.g. profit maximization in terms of satisfaction or a target rate of return etc.) of the organization. The in-house service should provide equal unit contributions towards the overall margin of the organization. It should not depend on subsidies from other departments. In other words, it must justify its existence. Therefore, it is advisable that the operator must think in terms of supply and demand. An assessment of the demand likely to be made on the system is vitally important.

In any assessment one has to take into account the likely cost of the service if purchased from an outside source and that provided by an 'in-house' service.

It would be appropriate here to examine the cost of services presently available from UKCIS. Taking CA Condensates as a convenient example, the annual cost to a user of a profile is made up of three elements:

(a) A basic subscription: at present £65 per part of CA Condensates.
(b) A surcharge for the number of 'search terms' used in the profile—at present £5 per unit of fifty search terms.
(c) A surcharge for the number of output items produced—at present £5 per unit of 150 output items.

The minimum cost is therefore £75 per annum. Relatively few users require more than fifty search terms to define their interests in the profile but most users require more than 150 output items in the course of the year. The overall average cost is around £100–£110.

It is a relatively simple matter to determine, in our system, the cost of each relevant item supplied. Taking CA Condensates as an example, the cost per relevant item notified ranges from 30p to 45p. The cost to a user will, however, be significantly higher than this because there are a number of tasks he has to undertake, in addition to paying his subscription, before the system will provide him with anything at all.

It has always been our policy that the construction of search profiles must be the responsibility of the user because we feel that he is the only person finally able to judge the aptness of the search terms used in his profile. Even if, as we hope will be the case, we can substantially assist the user in profile construction by, for example, a semi-automatic profile construction technique, which we are currently developing at UKCIS, we will still expect him to be the final arbiter of the form the profile will take.

The other significant cost to the user is that associated with determining from the output he receives which references are relevant and which are not. The effect of time spent to do this will depend on many factors; in some cases the assessment can be made on the basis of the bibliographic information on output cards alone. In others reference to an abstract or original document may be necessary. On average, however, there will be some cost which relates to the determination of relevance. Therefore the cost of using outside service can be divided into 2 parts:

(a) the cost of the operational service;
(b) the cost of profile construction and maintenance.

We can draw an analogy here between information and the analyst service. For a small organization it is always advantageous to send analytical work to outside contractors. In the same way, for a small work load, it is more convenient and economical to use information retrieval services offered by external operators.

CURRENT AWARENESS LIST

Recent additions to the Aslib library catalogue are broken down into twelve broad groups, whose coverage is indicated below. These groups are not mutually exclusive but it is hoped that users will find them helpful in scanning for new items of interest.

User Studies
Analyses of information-seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory.

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject Organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies; reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; genera libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies; directories.

JANET WALKLEY
Librarian

CURRENT AWARENESS LIST

Items are available in the Aslib Library and may be borrowed unless marked to indicate reference copies.*

User Studies

THURONYI, GEZA T. *and* PIETKIEWICZ, WESLEY
User participation in an information system.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.141–6.

HARMON, GLYNN
Information need transformation during inquiry: a reinterpretation of user relevance.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.41–3.

SHAW, RALPH R.
Pilot study on the use of scientific literature by scientists.
Metuchen, N.J.: Scarecrow Reprint, 1971.
0.8108 0346 1
iii, 139p.

WHITTON, DAVID
Information and the quantity surveyor.
CIIG Bulletin, vol.2, no.1, January 1972. p.21–2.
The role of the quantity surveyor and his consequent information needs.

LAWANI, S. M.
Periodical literature of tropical and subtropical agriculture.
Unesco Bulletin for Libraries, vol.26, no.2, March–April 1972, p.88–93.
Analyses the periodicals in which material most frequently appears, bibliographic scatter and language frequency.

WEISMANN, HERMAN M.
Technical librarians and the National Standard Reference Data System.
Special Libraries, vol. 63, no. 2, February 1972, p.69–76.
Survey of use of National Standard Reference Data System publications in U.S. technical libraries.

NOVAK, MIROSLAV
Zur Benutzung der ostsprachigen technischen Literatur.
Zeitschrift für Bibliothekswesen und Bibliographie, vol. 19, no.1, 1972, p.17–21.
The use of technical literature in Eastern languages at the Technische Informationsbibliothek, Hanover.

AYERS, JERRY B.
Journal articles related to the transplutonium elements.
Journal of Chemical Documentation, vol.12, no.1, February 1972, p.23–6.
Compares the retrieval efficiency of *Chemical Titles* with that of *Chemical Abstracts* and *Nuclear Science Abstracts*.

LIPETZ, BEN-AMI
Catalog use in a large research library.
Library Quarterly, vol.42, no.1, January 1972, p.129–39.

LUNIN, LOIS F. *and* CATLIN, FRANCIS I.
Information science in the medical school curriculum: a pioneer effort.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.37–9.

Communication and Knowledge

ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7: the information conscious society: edited by Jeanne B. North. Washington, D.C.: ASIS, 1970.
x, 348p.

CRAWFORD, SUSAN
Communication centrality and performance.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.45–8.

ALLEN, T. J., *and others*
Technology transfer to developing countries: the international technological gatekeeper.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.205–10.

COSATI
Progress in scientific and technical communications 1970 annual report.
Washington (D.C.): COSATI, September 1971.
viii, 146p.

SKLOVSKY, G. A.
The information ecosystem in the knowledge environment.
Australian Library Journal, vol.21, no.1, February 1972, p.5–11.
The theory of information processing and transfer and how this is reflected in the proposed Australian national information system and in the information service of ICI Australia.

KOCHEN, MANFRED
Directory design for networks of information and referral centers.
Library Quarterly, vol.42, no.1, January 1972, p.59–83.

FREEMAN, PETER
Network prospects for the legal profession.
Law Library Journal, vol.65, no.1, February, 1972, p.4–12.
The information needs of American lawyers and how the networking of law libraries can help to satisfy them.

DAVIS, JOHN M.
The transmission of information in psychiatry.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.53–6.

GOLDBERG, MURREY D.
Worldwide network for exchange of neutron physics numerical data.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.19–21.

TCHUIGOUA, J. FOUNOU
Documentation and development: experience in Algeria.
Unesco Bulletin for Libraries, vol.26, no.2, March–April 1972, p.73–9.
Work in Algeria's most important commercial library and information centre.

SINAI, ALI *and* HARVEY, JOHN F.
Recent Iranian information science progress.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.191–3.

Information Processing Systems

ONTARIO. Commission on Post-Secondary Education. Libraries and information storage and retrieval systems.
Toronto: Queen's Printer, 1972.
[*ca.* 130p.]

GECHMAN, MARVIN C.
Analysis of technical data bases and processing services.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.97–9.

LEGGATE, P.
The evaluation of operational current awareness services: a discussion of practical and theoretical problems of experimental design.
Oxford: Experimental Information Unit, September 1971.
59, [6]p.; bibliog. (OSTI report no. 5111).

KING, DONALD W. *and* CALDWELL, NANCY W.
Cost effectiveness of retrospective search systems.
Washington (D.C.): American Psychological Association, 1971.
33p. (ED 051837).

HEAPS, H. S. *and* KO, W. C. C.
Automatic adaptive processing of questions in document retrieval.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.319–21.

JUNKINS, KATHERINE *and* SCHULTZ, LOUISE
An alternate strategy to iterative searching.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.323–5.

NATIONAL SCIENCE LIBRARY (Canada)
CAN/SDI Project: profile design manual, 3rd ed.
Ottawa: the Library, January 1972.
1v. (var. pag.)

LINE, MAURICE B. *and others*
Experimental information service in the social sciences 1969–71: final report, by Maurice B. Line, Dawn Cunningham, Susan Evans.
Bath: Bath University Library, January 1972, 900843 22 5.
[4], 122, [40]p.

HANFORD, W. E. *and others*
Chemical news via audio tapes: Chemical Industry News.

Journal of Chemical Documentation, vol.12, no.1, February 1972, p.3–4.
The dissemination of taped information to executives in the chemical industry.

EDGILL, BRIAN C.
Proposals for an information system: the construction industry.
CIIG Bulletin, vol.2, no.1, January 1972, p.5–10.
Current work in the area of preferred vocabulary, classification, coding, project and general information etc.

GORDON, IRVING, *and others*
Design and implementation of a chemical information center.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.177–9.

KING, HAROLD *and* MILLER, ELIZABETH K.
The regional urban information network: a solution to the urban information dilemma?
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.181–3.

FARKAS, IRENE S. *and* FARKAS, TIBOR G.
Problems of hospital information systems.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p. 167–9.

SALMON, RAPHAEL J.
Planning with facts: a new approach for Medicaid.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.153–7.

KENNEY, BRIGITTE L. *and others*
An automated index and search system for psychiatric videotapes.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.129–39.

PORTER, ROGER J., *and others*
Epilepsy Abstracts Retrieval System (EARS): a new concept for medical literature storage and retrieval.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.171–2.

COLEMAN, RAYMOND J. *and* RILEY, M. J.
The organizational impact of MIS.
Journal of Systems Management, vol.23, no.3, March 1972, p.13–9.
How management information systems affect decision-making at various levels of management.

BURCH, JOHN G.
An independent information system.
Journal of Systems Management, vol.23, no.3, March 1972, p.36–41.
Management information should be made available to interested groups outside the organization such as stockholders and trustees.

Language and Indexing

SCHARF, B.
Objective assessment of specialized dictionaries: analysis and method.
Aslib Technical Translation Bulletin, vol.18, no.1, Spring 1972, p.20–7.
The statistical testing of the worth of technical dictionaries.

ALEMAN, VERONICA
Problema terminologiei stiintifice si tehnice prin prisma informarii'documentare.
Probleme de Informare si Documentare, vol.6, no.1, January 1972, p.17–30.
The evolution of scientific and technical terminology and criteria for its standardization.

NORRIS, C.
NLL Review, vol.2, no.2, April 1972, p.56–60.
The use of MeSH.

WOODS, WILLIAM EDWARD
Headings, subject: see SUBJECT HEADINGS.
Library Resources and Technical Services, vol. 16, no.1, Winter 1972, p.79–81.
Suggests a standardized format for subject headings in indexes, bibliographies etc.

*VIET, JEAN
Thesaurus for information processing in sociology: prepared under the auspices of the International Committee for Social Science Information and Documentation.
Paris: Mouton, 1971.
335p. (Maison des Sciences, de l'Homme. Service d'Echange et d'Informations Scientifiques publications: serie D.)

HARGRAVE, CHARLES W. *and* WALL, EUGENE
Retrieval improvement effected by use of a thesaurus.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.291–4.

THORNTON, JOHN L.
The use of indexes.
The Indexer, vol.8, no.1, April 1972, p.17–9.
Criteria of good indexes and an examination of 12 books in their light.

TATHAM, F. H. C.
What is a good index?
The Indexer, vol.8, no.1, April 1972, p.23–8.
Criteria of good book indexes.

HARLING, BRUCE S.C.
The state of the indexing art in British engineering books; a general impression.
The Indexer, vol.8, no.1, April 1972, p.13–6.
Provides statistics on indexes between 1891–1971.

COLLISON, ROBERT L.
Current American trends in indexing.
The Indexer, vol.8, no.1, April 1972, p.20–2+8 pages of illus. following p.40.
Developments in several American collective indexes to periodicals.

HOLMSTROM, J. EDWIN
The indexing of multi-author, multi-volume and periodical publications.
The Indexer, vol.8, no.1, April 1972, p.31–43+12 pages of illus. preceding p.41.
Problems in indexing weekly, monthly, bi-monthly and annual publications, with 4 case studies.

HARROD, L. M.
Training for indexing.
The Indexer, vol.8, no.1, April 1972, p.50–3.
The courses held by the Society of Indexers.

FALK, HOWARD *and* TOMPKINS, HOWARD E.
Author assisted indexing.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.283–90.

WILLIAMS, JOHN H.
Research on automatic indexing, classification, and abstracting techniques: final report. Gaithersburg (Mary.): IBM Federal Systems Division, April 1971.
[ii], 6p. (AD 723168)

O'TOOLE, WILLIAM E. *and* KEPLINGER, MICHAEL S.
An experimental program for automatic indexing at the National Bureau of Standards.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.301–8.

BOTTLE, R. T. *and* SCHWARZLANDER, H.
Variations in the assessment of the information content of documents.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.279–81.

SARACEVIC, TEFKO
Ten years of relevance experimentation: a summary and synthesis of conclusions.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.33–6.

FLURY, WILLIAM R. *and* HENDERSON, DIANE D.
A user oriented KWIC index: KWOC-ed, tagged and enriched.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.101–5.

SMITH, PATRICIA P.
Increasing recall of keyword indexes by automatically indexing root character strings.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.275–7.

HERR, J. JOANNE
Use of data-base access for interindexer communication and for indexer training.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.163–6.

ELROD, J. MCREE
The two-language collection with the bilingual reader.
International Cataloguing, vol.1, no.1, January–March 1972, p.6–8.
Problems of producing catalogues for material in several languages and/or scripts.

CUNNINGHAM, DALE S.
Multi level translation: a solution to foreign language information needs.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.245–7.

Classification and Cataloguing

BIOSCIENCES INFORMATION SERVICE
Subjects classification outline for *Biological Abstracts* and *Bioresearch Index*.
Philadelphia (Pa.): Biological Abstracts, 1972. 21p.

AMERICAN INSTITUTE OF PHYSICS
Physics and astronomy classification scheme.
New York: American Institute of Physics, Information Division, 1971.
110p.

WOLFF-TERROINE, M.
La classification automatique: son utilisation dans la science de l'information.
Documentaliste, vol.9, no.1, March 1972, p.21–4.
The principles of automatic classification and their application to information science.

MOWERY, ROBERT L.
The cryptic other.
Library Resources and Technical Services, vol. 16, no. 1, Winter 1972, p.74–8.
A recent survey of U.S. academic libraries shows that classification schemes used are 'LC', 'DC' and 'other': the article examines the meaning of 'other' and thus throws light on the trend to reclassify by 'LC'.

TAYLOR, GERRY M. *and* ANDERSON, JAMES F.
It will cost more tomorrow.
Library Resources and Technical Services, vol.16, no.1, Winter 1972, p.79–81.
The reclassification of the bookstock of Arkansas State University Library from DC to LC.

BAKEWELL, K. G. B.
A manual of cataloguing practice.
Oxford: Pergamon, 1972. 08 0166 97 0. xiii, 298p.; bibliog. (International Series of monographs in library and information science, no. 14)

BRYANT, P. *and others*
The Bath Mini-Catalogue: a progress report by P. Bryant, G. M. Venner and M. B. Line.
Bath: Bath University Library, February 1972.
41, [57]p.

BIRMINGHAM LIBRARIES CO-OPERATIVE MECHANIZATION PROJECT.
Costing catalogue systems in three libraries. Birmingham: the Project, 1972. 0-903154-02-1.
[1], 37p.

MALTBY, A. *and* DUXBURY, A.
Description and annotation in catalogues: reader requirements.
New Library World, vol.73, no.862, April 1972, p.260–2, 273.
A study by Manchester and Belfast Schools of Librarianship.

GREEN, MALCOLM
Cataloguing of series publications.
CIIG Bulletin, vol.2, no.1, January 1972, p.26–7.
To what extent do report series in civil engineering need cataloguing, and how far can the indexes to the series serve the librarian's purpose.

PROTOPOPOFF, ANNE T.
Form cards for specialized cataloguing.
Special Libraries, vol.63, no.2, February 1972, p.79–81.
The use of preprinted form cards for cataloguing pamphlets.

HENRICH, FREDERICK K.
The fallacy of corporate authorship: how its continuance prevents effective cataloging of government documents.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.233–5.

Mechanization

MASON, ELLSWORTH
Computers in libraries.
Library Resources and Technical Services, vol. 16, no.1, Winter 1972, p.5–10.
Argues that library automation was accepted without critical evaluation of its huge cost.

AVRAM, HENRIETTE D.
Library automation: a balanced view.
Library Resources and Technical Services, vol. 16, no.1, Winter 1972, p.11–18.
Attempts to refute 2 recent papers by Ellsworth Mason criticizing the positive accomplishments in the field.

WARHEIT, I. A.
The small computer and the library.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society

for Information Science: volume 7...1970, p. 91–3.

RETTENMAYER, J. W.
File ordering and retrieving costs.
Information Storage and Retrieval, vol.8, no.2, April, 1972, p.79–93.
The use of clustering to recorder files for the purpose of reducing costs and increasing the retrieval rate early in the response period.

SASAMORI, KATSUNOSUKE
Software design for vocabulary control (DOCTOR) system.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.195–7.

BILLINGSLEY, ALICE
Bibliography of library automation.
American Libraries, vol.3, no.3, March 1972, p.289–312.
Covers 1969–71 and supplements that compiled by Charlene Mason in *ALA Bulletin*, September 1969, p.1117–34.

WRIGHT, G. H.
MARC: library automation and the colleges.
College Bibliocentre Newsletter, no.2, February 1972, p.9–15.
The use of MARC in Canada.

BIERMAN, KENNETH JOHN
An operating MARC-based SDI system, some preliminary services and user reactions.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.87–9.

BLAIR, JOAN
Routing slips from the computer.
Special Libraries, vol.63, no.2, February 1972, p.82–4.
A computerized system of printing and updating routing lists.

SIMMONS, PETER
Reserve collections: some computer assistance for the perennial problems.
Canadian Library Journal, vol.29, no.2, March–April 1972, p.82–7.
Practice with reserve collections in the University of British Columbia Library, including the use of a computer to produce lists of course materials and loans statistics.

NORRIS, JEAN A. *and* JOERGER, ROBERT E.
University of Florida libraries automated union serials list.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.73–7.

SIMMONS, PETER
Improving collections through computer analysis of circulation records in a university library.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.59–63.

NEWCASTLE UNIVERSITY. Computing Laboratory *and* NEWCASTLE UNIVERSITY LIBRARY.
Catalogue computerization project: final report to OSTI, 1967–71.
Newcastle: the University, [1971]
3v. (OSTI report no. 5110)

MATTHEWS, FRED W.
Weighted term search: a strategy for searching a large file by computer for document retrieval.
In
ASIS, Annual Meeting, 33rd, Philadelphia 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.315–17.

KILGOUR, FREDERICK G., *and others*
Retrieval of bibliographic entries from a name-title catalogue by use of truncated search keys.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.79–82.

POMASSL, GERHARD
Reihe C der *Deutschen National-bibliographie* auf EDV umgestellt.
Zentralblatt fur Bibliothekswesen, vol.86, no.2, February 1972, p.93–5.
The publication of part of the East German national bibliography with the aid of a computer.

BELTON, M.
Computer-aided production of the subject index to the *SMRE Bibliography*.
The Indexer, vol.8, no.1, April 1972, p.44–9.
The use of a computer to create a subject index from the titles of staff papers for the *SMRE Bibliography* produced by the Safety in Mines Research Establishment.

BAUER, CHARLES K.
Automation and its lessons.
Special Libraries, vol.63, no.2, February 1972, p.47–52.
The lessons to be learnt from the continuing automation of the Technical Information Department of Lockheed-Georgia Co.

NYSSEN, R. *and others*
Du fichier conventionnel au système documentaire dit SIDERAL: ou six années de documentation dans le group petrolier ELF-ERAP.
Documentaliste, vol.9, no.1, March 1972, p.2–16.
On-line information retrieval at the ELF–ERAP group of petroleum companies and other operations of the information service.

LYNCH, MICHAEL F. *and others*
Computer handling of chemical structure information, by Michael F. Lynch, Judith M. Harrison and William G. Town.
London: Macdonald, 1971. 356 03866 1.
xii, 148p.

PICK, R. O. *and others*
Strategy of data retrieval and analysis from large biological and chemical files.
Journal of Chemical Documentation, vol.12, no.1, February 1972, p.35–7.
An approach to retrieval and analysis of data from the files of the antimalarial drug development programme at the Walter Reed Army Institute of Research.

ECKERMANN, E. H. *and others*
Processing data from a large drug development program.
Journal of Chemical Documentation, vol.12, no.1, February 1972, p.38–40.
Processing biological and chemical data from the antimalarial drug programme of the Walter Reed Army Institute of Research.

SMITH, DANIEL R. *and others*
Computerized drug information services.
Journal of Chemical Documentation, vol.12, no.1, February 1972, p.9–13.
Comparison between 4 computerized services for overlap, timeliness and unique areas of journal coverage.

OHIO STATE UNIVERSITY LIBRARIES
On-line remote catalog access and circulation control system: Part I: functional specifications: Part II: user's manual.
Columbus (Ohio): the University Libraries Publications Committee, 1971.
1v. [var pag.].

LANCASTER, F. WILFRED
Evaluation of on-line searching in MEDLARS (AIM–TWX) by biomedical practitioners. Champaign (Ill.): Illinois University Graduate School of Library Science, February 1972.
22p. (Occasional papers no. 101).

CHEN, SIMON P. J.
On-line and real time cataloguing by ATS.
LARC Newsletter, vol. 4, no. 2, February 1972, p. 1–2.
The production of a card catalogue using an on-line IBM 2471 at Western Kentucky University Library.

LANDAU, ROBERT M.
New economic factors in the integration of computer terminal on-line retrieval systems and large microform data banks.
Journal of Micrographics, vol.5, no.3, January 1972, p. 25–9.

STILLER, JOY DANCIS
Use of on-line remote access information retrieval systems.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.107–9.

RAE, PATRICK D. J.
On-line information retrieval systems: experience of the Parkinson Information Center using the SUNY Biomedical Communication Network.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.173–6.

KENNEDY, JAMES H. *and* SOKOLOSKI, JAMES S.
Man–machine considerations of an operational on-line university library acquisition system.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.65–7.

MCALLISTER, CARYL
Cataloguing and display of bibliographic information in an on-line catalog.
In
ASIS, Annual Meeting, 33rd, Philadelphia 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.69–72.

COOK, KENNETH H.
An experimental on-line system for *Psychological Abstracts*.

In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.111–4.

HERSEY, DAVID F. *and others*
Comparison of on-line retrieval using free text words and scientist indexing, by David F. Hersey, Willis R. Foster, Ernest W. Stelder and William T. Carlson.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science; volume 7...1970, p.265–8.

GOLDFARB, CHARLES F.
An on-line system for integrated text processing.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.147–50.

CLARKE, D. C.
Query formulation for on-line reference retrieval: design considerations from the indexer/searcher viewpoint.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p. 83–6.

TRESSEL, GEORGE W., *and others*
Automated retrieval and remote viewing of COSATI microfiche: problems and prospects.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.123–8.

SMITH, GLORIA L. *and* HERR, J. JOANNE
Searching the *Nuclear Science Abstracts* data base by use of the Berkeley Mass Storage System.
Journal of Chemical Documentation, vol.12; no.1, February 1972, p.26–9.
An on-line system with capacity equivalent to 100 IBM-2321 data cells, high serial-road rate, archival data storage and random access capability.

FELDMANN, RICHARD J. *and* HELLER, STEPHEN R.
An application of interactive graphics: the nested retrieval of chemical structures.
Journal of Chemical Documentation, vol.12, no.1, February 1972, p.48–54.

FELDMANN, RICHARD J., *and others*
An application of interactive computing: a chemical information system.
Journal of Chemical Documentation, vol.12, no.1, February 1972, p.41–7.
The use of the structural diagram as the means of interaction between a chemist and his computerized information system.

MINKEL, VERA
Data terminal and your library.
Tempe (Ariz.): LARC Association, 1972. 84p.

LANDAU, ROBERT M.
Computer terminals: the gate-way to intellectual infinity thru networks, the intellectual super-highways of the '70's.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.237–9.

HARVEY, JOHN F. *and* SINAI, ALI
The Irandoc–Tebroc automation program.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.215–17.

Subject Organization

KREYSA, FRANK J.
SSIE: an information centre which stores foresight.
Journal of Chemical Documentation, vol.12, no.1, February 1972, p.19–22.
A centre supplying information on on-going research (the Smithsonian Science Information Exchange).

BIGGS, PENELOPE
Institute for the Study of Drug Dependence.
Library Association Record, vol.74, no.4, April 1972, p.74.
Describes the work of the I.S.D.D. library.

BERGER, R.
Le service de documentation de Wendel–SIDELOR: une expérience originale.
Documentaliste, vol.9, no.1, March 1972, p.17–19.
The SDI service and other information processing activities at the Wendel–SIDELOR Company.

TULLIER, P. M.
The Hamlet Evaluation System (HES/70): a large-scale computer assisted management information system for measuring pacification in South Vietnam.

In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.115–22.

POSTELNICU, M.
Aspecte din activitatea documentară în domeniul hidrotehnic.
Probleme de Informare si Documentare, vol.6, no.1, January 1972, p.34–44.
Work at the Hydraulic Engineering Information Centre in Romania.

ZÉRAFFA, JOSETTE
L'I.N.S.E.R.M. et l'information biomedicale.
Bulletin des Bibliothèques de France, vol.17, no.2, February 1972, p. 35–65.
The automated medical information centre of the Institut de la Santé et de la Recherche Médicale and its services.

ZENO, COSTE
Organizarea şi eficienta informarii documentare la Institutul de proiectare Timisoara.
Probleme de Informare şi Documentare, vol.6, no.2, February 1972, p.94–9.
Documentary information services at the Timişoara Design Institute in Romania.

*HILLS, JACQUELINE
A review of the literature on primary-communications in science and technology.
London: Aslib, 1972. 85142 039 7.
[4], 36p. Aslib Occasional Publication no.9)

WHITE, BRENDA
Use of information in planning.
CIIG Bulletin, vol.2, no.1, January, 1972, p.2–4.
Sources of information in planning education research and practice, and the problems they present.

JACOB, R. A.
Information problems and the law.
Information Scientist, vol.6, no.1, March 1972, p.3–13.
The information services available for tracing statute and case law in Britain.

SLAMECKA, VLADIMIR
A selective bibliography on library operations research.
Library Quarterly, vol.42, no.1, January 1972, p.152–8.

GALVIN, THOMAS J.
Current problems in reference service, New York, London: Bowker, 1971, 0 8352 0425 1.
xviii, 162p.; bibliog.

Reprography

NATIONAL MICROFILM ASSOCIATION. Annual Meeting and Convention, 20th, Washington D.C., 1971.
Infographics update: proceedings..., edited by P. Richard Poulin.
Silver Spring (Md.): the Association, 1971.
1v. [var. pag.].

REVILL, D. H.
Reprographic reflections.
New Library World, vol.73, no.862, April 1972, p.263–6.
Review of new equipment on the British market.

REINTJES, J. FRANCIS, *and others*
A high-magnification, reflective screen microfiche viewer.
Journal of Micrographics, vol.5, no.3, January 1972, p.117–22.
Description and evaluation of an experimental microfiche viewer that projects images on a vertical, matt, nondirectional reflecting screen.

EVANS, CHARLES W.
High reduction microfiche for libraries: an evaluation of collections from the National Cash Register Company and Library Resources Inc.
Library Resources and Technical Services, vol.16, no.1, Winter 1972, p.33–47.

WILBER, ALAN W.
Microfiche systems for the small user.
Journal of Micrographics, vol.5, no.3, January 1972, p.131–6.
Survey of 50 military users of microfiche to develop design criteria for storage and retrieval systems for small technical information activities.

WALL, R. A.
COMP: Computer Output Microfilm Peek-a-boo.
NRCd Bulletin, vol.5, no.2, Spring 1972, p.42–3.
The production by computer of optical coincidence files on fiche.

PARSONS, R. B.
The economics of microforms as a storage medium in libraries.
NLL Review, vol.2, no.2, April 1972, p.45–55.
Costing storage of periodicals in microform and hardcopy based on National Lending Library experience.

KEPLINGER, MICHAEL S.
The case for invisible copies.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.241–3.

MAYNARD, JEFF
What the Post Office has to offer.
Computer Management, vol.7, no.3, March 1972, p.34–6.
Describes the Post Office's 5 Datel services for computer data transmission.

KNIGHT, GEORGE
Desk-top information systems utilizing lithographed micro-images.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.225–6.

OHLMAN, HERBERT
How to attend a distant conference at home: the 1966 UNYSADI teleconference.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.227–32.

Printing and Publishing

BURNS, G. H.
Journal indexes—for editorial use.
The Indexer, vol.8, no.1, April 1972, p.62–5.
The compilation, for editorial office use, of an index to the editor's collection of issues of his journal accumulated over the years.

BAULKWILL, W. J., *and others*
The preparation of reports: a guide for authors, editors and typists, by W. J. Baulkwill, N. W. Posnett and P. M. Reilly. Tolworth, Surrey: Great Britain. Foreign and Commonwealth Office, Overseas Development Administration. Land Resources Division, 1971.
2v.

KRISTY, NORTON F.
System design for microbook publishing.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.221–3.

BECK, LEONARD N.
Soviet discussion of the exponential growth of scientific publications.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.5–17.

VELKE, LISSA
The use of citation patterns in the identification of 'research front' authors and 'classic' papers.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.49–50.

SENGUPTA, I. N.
Impact of scientific serials on the advancement of medical knowledge: an objective method of analysis.
International Library Review, vol.4, no.2, April 1972, p.169–95.
A new method for selecting periodicals based on citation counting in the Annual Review bibliographies.

CANHAM, G. W. RAYNER
Information problems of an inorganic chemist.
Journal of Chemical Documentation, vol.12, no.1, February 1972, p.5–6.
Citation patterns in journals carrying material in inorganic chemistry.

CARROLL, JOHN M.
Privacy—and the computer.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.311–13.

Administration and Management

REDFERN, BRIAN
Studies in library management, volume 1, London: Bingley, 1972. 0 85157 122 0.
168p.; bibliogs.

CHICAGO UNIVERSITY. Graduate Library School.
Proceedings of 35th Annual Conference, Chicago, 2nd–4th August 1971. Operations Research: implications for libraries.
Library Quarterly, vol.42, no.1, January, 1972, p.1–160.
11 papers.

MORSE, PHILIP M.
Measures of library effectiveness.
Library Quarterly, vol.42, no.1, January 1972, p.15–30.

CHURCHMAN, C. WEST

Operations research prospects for libraries: the realities and ideals.

Library Quarterly, vol.42, no.1, January 1972, p.6–14.

HAMBURG, MORRIS, RAMIST, LEONARD E. *and* BOMMER, MICHAEL R. W.

Library objectives and performance measures and their use in decision making.

Library Quarterly, vol.42, no.1, January 1972, p.107–28.

LEIMKUHLER, FERDINAND F.

Library operations research: a process of discovery and justification.

Library Quarterly, vol.42, no.1, January 1972, p.84–96.

KORFHAGE, R. R., NARAYAN BHAT, V. *and* NANCE, RICHARD E.

Graph models for library information networks.

Library Quarterly, vol.42, no.1, January 1972, p.31–42.

WILSON, JOHN H.

Major trends and portents related to information costs.

In

ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.249–52.

MASON, DONALD

PPBS: application to an industrial information and library service.

Journal of Librarianship, vol.4, no. 2, April 1972, p.91–105.

The use of the Planning–Programming–Budgeting System to quantify the cost benefits of information activities.

KOUNTZ, JOHN

Library cost analysis: a recipe.

Library Journal, vol.97, no.3, 1st February 1972, p.459–64.

Describes methods of cost analysis and includes bibliography.

HOHNE, HERBERT

Die Steigerung de Effektivität der bibliographischen Arbeit.

Zentralblatt für Bibliothekswesen, vol.86, no.2, February 1972, p.65–75.

The application of cost-effective techniques to information work.

WARD, PATRICIA LAYZELL

The evaluation of library services.

In

REDFERN, BRIAN

Studies in library management, vol.1, 1972, p.57–85.

EYRE, JOHN

Computers and libraries: the implications for management.

In

REDFERN, BRIAN

Studies in library management, vol.1, 1972.

p.137–68.

WEBBER, N. A.

A library historian's thoughts on management.

In

REDFERN, BRIAN

Studies in library management, vol.1, 1972, p. 11–25.

STAGGS, EARL W.

Maybe it's your forms.

Journal of Systems Management, vol.23, no.3, March 1972, p.8–12.

The design of business forms.

MATARAZZO, JAMES M.

Scientific journalist: page or price explosion?

Special Libraries, vol.63, no.2, February 1972, p.53–8.

The relationship between increases in the number of pages per journal issue and rises in subscriptions, illustrated by the history of physics journals, 1959–69.

GOYAL, S. K.

A systematic method for reducing over-ordering copies of books.

Library Resources and Technical Services, vol. 16, no.1, Winter 1972, p.26–32.

The application of scientific management to book-ordering and so avoiding unnecessary duplication.

STRICKLAND, J. T.

Library buildings.

In

REDFERN, BRIAN

Studies in library management, vol.1, 1972, p.89–110.

BECKMAN, MARGARET

International colloquium on the construction of university libraries.

Canadian Library Journal, vol.29, no.1, January–February 1972, p.28–9.

GRELLIER, JACQUELINE

La Bibliothèque universitaire de Toulouse: section sciences.

Bulletin des Bibliothèques de France, vol.17, no.1, January 1972, p.1–11.

Description of the layout of the science section of Toulouse University Library.

ROCHESTER, MAXINE K.
Demand for and supply of librarians.
Australian Library Journal, vol.21, no.1, February 1972, p.12–20.
Statistics of present staff of the demand for staff and the possibilities of supply in Australian libraries, by type of library.

GILROY, RUPERT
Paying for personnel: the largest item in the library budget.
College Library Notes, no.14, 1972, p.1–4.
Deploying academic library staff to best advantage.

PEELE, DAVID
Some aspects of staff evaluation in the UK and the USA.
Library Association Record, vol.74, no.4, April 1972, p.69–71.
Compares Britain's informal oral method of evaluating staff and the USA's formal written one.

GLOVER, F. *and* KLINGMAN, DARWIN
Mathematical programming models and methods for the journal selection problem.
Library Quarterly, vol.42, no.1, January, 1972, p.43–58.

HAMANN, EDMUND G.
Out-of-print periodicals: the United States Book Exchange as a source of supply.
Library Resources and Technical Services, vol. 16, no.1, Winter 1972, p.19–25.
The functions of the USBE, its periodicals holdings and relations with similar services provided by commercial dealers and library duplicates exchange networks.

SMITH, RICHARD DANIEL
Maps: their deterioration and preservation.
Special Libraries, vol.63, no.2, February 1972, p.59–68.

DO technical reports belong to the literature?
Nature, vol.236, no.5345, April 7, 1972, p.275.
The actual and desirable relations between technical reports and the main body of scientific literature.

RESNIKOFF, H. L. *and* DOLBY, J. L.
On archival access.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.255–64.

BUCKLAND, MICHAEL K.
An operations research study of a variable loan and duplication policy at the University of Lancaster.
Library Quarterly, vol.42, no.1, January 1972, p.97–106.

PEACOCK, P. G.
The short loan collection in a university library.
Journal of Librarianship, vol.4, no.2, April 1972, p.130–6.
Stirling University Library's short loan collection of heavily used material.

MCDONALD, ALICE P.
Circulation procedures in law libraries.
Law Library Journal, vol.65, no.1, February 1972, p.58–64.

Library Systems

COBLANS, H.
UNISIST: a world science information system.
Science Policy, vol.1, no.2, March–April 1972, p.1–4.

SYLVESTRE, GUY
The UNISIST conference.
Canadian Library Journal, vol.29, no.2, March–April 1972, p.91–7.

WYSOCKI, A. *and* TOCATLIAN, J.
UNISIST intergovernmental conference.
Unesco Bulletin for Libraries, vol.26, no.2, March–April 1972, p.58–62.
The principles, objectives and management of the world science information system (UNISIST) as they emerged from the October 1971 Conference.

HAVARD-WILLIAMS, P.
International librarianship.
Unesco Bulletin for Libraries, vol.26, no.2, March–April 1972, p.63–8.
International library co-operation and the work of international library bodies.

AMAN, MOHAMMED M.
The year's work in international librarianship: 1970.
International Library Review, vol.4, no.2, April 1972, p.235–50.
Review of articles of comparative librarianship interest published in 1970.

LINE, MAURICE B.
The developing national library network in Great Britain.
Library Resources and Technical Services, vol. 16, no.1, Winter 1972, p.61–73.
The relations between the constituent parts of the British Library, the need or otherwise for union catalogues and the current state of national bibliography.

URQUHART, D. J.
NLL progress 1971.
NLL Review, vol.2, no.2, April 1972, p.39–44.
Reviews volume of demand, donations, visitors, buildings, courses, MEDLARS etc.

SYLVESTRE, GUY
The developing national library network of Canada.
Library Resources and Technical Services, vol. 16, no.1, Winter 1972, p.48–60.
The networking of Canadian library resources and the roles of the National Library and National Science Library.

HEAPS, DOREEN M. *and* COOKE, G. A.
National policies, national networks, and national information studies in Canada.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.199–203.

CRÉATION d'une commission de co-ordination de la documentation administrative: décret du 13 juillet 1971.
Bulletin des Bibliothèques de France, vol.17, no.1, January 1972, p.17–19.
The setting up of a commission to co-ordinate work in government libraries and the publication of official documents in France.

CHANDLER, GEORGE
Three Russian national libraries: an analysis of Soviet Studies.
International Library Review, vol.4, no.2, April 1972, p.213–34.
The status and activity of the State Lenin Library, the All-Union Library of Foreign Literature and Saltykov-Shchedrin Public Library in Leningrad.

STOICA, ION
The Central University Library, Bucharest: over seventy-five years in the history of a collection.
Unesco Bulletin for Libraries, vol.26, no.2, March–April 1972, p.94–6.

JONGE, A. A. DE
Vijftig jaar Centrale Catalogi.
Open, vol.4, no.3, March 1972, p.143–8.
A history of the union catalogue at the Koninklijke Bibliotheek in The Hague, 1922–72.

ROBERTS, NORMAN
University libraries.
Library Association Record, vol.74, no.3, March 1972, p.47–9.
Progress in British university libraries discussed under the headings: demand/response, OSTI, binderies, library use; liaison with users, indexing and collection building.

Professional Activity

HOLROYD, GILEON
The study of organizations.
In
REDFERN, BRIAN
Studies in library management, vol.1, 1972, p.113–33.

SULLIVAN, PEGGY
The international relations program of the American Library Association.
Library Trends, vol.20, no.3, January 1972, p.577–91.

LETHÈVE, JACQUES
L'organisation de la profession de bibliothécaire en France et le rôle de l'Association des Bibliothecaires français.
Zeitschrift für Bibliothekswesen und Bibliographie, vol.19, no.1, 1972, p.62–5.
The professional organization of French librarians and the role of the Association des Bibliothecaires français.

COWLEY, JOHN
Education and training for librarianship.
In
REDFERN, BRIAN
Studies in library management, vol.1, 1972, p.29–53.

SMITH, E. L. J., *and others*
Part-time courses in librarianship and information work: a conference held at West London College, 23rd June 1971, by E. L. J. Smith, J. Davies and G. Glaister. London: West London College Department of Professional Studies, January 1972. 15p. (Occasional paper no. 1).

BORKO, HAROLD
Predicting research needs in librarianship and information science education.
In
ASIS, Annual Meeting, 33rd, Philadelphia, 1970. Proceedings of the American Society for Information Science: volume 7...1970, p.27–9.

GREAT BRITAIN. Department of Trade and Industry.
A survey of information projects, 3rd ed.
London: the Department, January 1972.
iv. 396p.

MEMBERS' ADVERTISEMENTS

Acceptance of advertisements for publication in Proceedings *does not imply Aslib support for or endorsement of the goods or services advertised.*

Members' advertisement rates: first 15 words (minimum), 50p; 3p for each additional word. 10p if box number required. (No agency discount.) A separate section of these columns is available to non-members at £3 per s.c.i.

Translations services

MEDICAL AND HIGHLY SPECIALIZED SCIENTIFIC TRANSLATIONS. S.M. Bonnekamp, FIL, Member of the Translators' Guild (Med. Science & Lit.), 47 Firs Close, Muswell Hill, London, N10. Tel. 01-883 3962 during office hours. After office hours an automatic telephone answering machine will record messages.

BUILDING AND CIVIL ENGINEERING TRANSLATIONS from Russian and German into English. G. L. Cairns, MIL, 19 Kingsley Place, London N6. Tel. 01-340 8990.

TECHNICAL SWEDISH, DANISH, NORWEGIAN translated by J. T. Craddock, B COM, FIL, Ekard, Ray Park Avenue, Maidenhead, Berks. Maidenhead 24931.

JAPANESE/ENGLISH, RUSSIAN/ENGLISH translations. Chemistry, medicine, biology, zoology. D. A. Fraser, BA, MIL, 22 Gresley Road, London, N19 3JZ. Tel. 01-272 5664.

WILFRED E. GOODAY, ARSM, DIC, C.ENG, MIMM, FIL. Member of Translators' Guild, Romanian and French. 161 Rivermead Court, London SW6. RENown 1912.

SCIENTIFIC TRANSLATIONS FROM JAPANESE, CHINESE, RUSSIAN, CZECH and other East and West European languages into English and/or German. A. K. Henn, BSC, 'Glenside', Lower Leigh Rd., Pontnewynydd, Pontypool, Mon. Tel. Pontypool 3689 (after 6 p.m.).

MEDICAL, PHARMACEUTICAL, BIOLOGICAL translations from French, Romanian and Portuguese into English and from English into French and Romanian. Dr. J. Jacobson, 94 Temple Fortune Lane, NW11. 01-455 1010.

TECHNICAL TRANSLATIONS from Russian, German and Polish into English. B. Klipstein, BSC(HONS), 1 Glenview Grove, Shipley, Yorkshire. Tel. Shipley 58215.

TECHNICAL AND COMMERCIAL translations from English into Russian. Mrs O. Linsley, 31 Parke Road, Barnes, London SW13. Tel. 01-748 8822.

TECHNICAL TRANSLATIONS from Japanese into English. R. A. Scutt, BA, 48 Somerset Avenue, West Wimbledon, London SW20. Tel. WIMbledon 1713 (01-946 1713).

TECHNICAL OR COMMERCIAL translations into/from English, German, Dutch and French. A. M. H. Speller, FIL NGV, 6 Lakeside, West Ealing, London W13 8HN. Tel. 01-998 1045.

AUTHORITATIVE TECHNICAL TRANSLATIONS. Spanish, French, Italian, German, Portuguese, camera copy or printed. E. W. Sykes, FIL, 39 West Close, Wembley, Middlesex, HA9 9PJ. Tel. 01-904 4275.

Advisory services

IRAS: A NEW ADVISORY SERVICE. As much or as little advice and assistance as you need—anything from a half-day's talk to a six-months' assignment. Miss Helen Townley, I.R. Advisory Services, 117 Wickham Chase, West Wickham, Kent, BR4 0BQ. 01-777 7560

LIBRARIAN

BROMLEY, KENT

PA INTERNATIONAL MANAGEMENT CONSULTANTS LTD. have their main Library and Information Centre at Bromley, Kent. The Library is in a new building within the grounds of Sundridge Park.

The Library provides our operating consultants with an information service and a comprehensive range of business and management books, films and periodicals.

An experienced Librarian, preferably a graduate, is required to head up this service. She will control a staff of about five and will be responsible for developing the service, in conjunction with similar centres abroad, into an international facility.

Salary is negotiable around £2,000 with ample scope for advancement.

To apply, please telephone A. Crompton—Tel: 01-235 6060 or write to him giving brief details of age, experience and salary.

PA

PA Management Consultants Ltd.,
2 Albert Gate, London SW1X 7JU

Wellcome

DEPUTY LIBRARIAN

This position at The Wellcome Research Laboratories, Beckenham, is to supervise a library specialising in the field of therapeutic research and to act as deputy to the Principal Librarian. Duties include responsibility for a small staff, classification and cataloguing, bibliographic searching and compilation of a union list of periodicals. The successful applicant will work closely with the Principal Librarian on matters of general library policy.

Candidates should be between 25 and 35 years of age and should possess a recognised qualification in Library or Information studies. Special Library experience is essential and preference will be given to applicants familiar with the bio-medical field.

Please write quoting reference PR.8 giving brief details of qualifications and experience to date to:

The Personnel Manager,
THE WELLCOME RESEARCH LABORATORIES,
Langley Court, Beckenham, Kent BR3 3BS.

POLYTECHNIC OF THE SOUTH BANK

Materials Curator

(Ref L.4)

£2,568–£2,874 plus London Weighting £69

in the Library of the
FACULTY OF CONSTRUCTION TECHNOLOGY & DESIGN

To be responsible for establishing and developing a Materials Exhibits Library. The post, which is newly created, offers an interesting challenge and an opportunity to organise a collection of samples of building materials for display and teaching purposes within the Faculty. Applicants should have experience in either construction technology and materials or in display and presentation techniques. A knowledge of library procedures would be an advantage. The post is graded ILEA Librarian II.

The appointment will be effective from 1st August 1972.

The Library of the Faculty is at present located at Ferndale Road, London, S.W.4, but will move in December 1972 to a new building at Wandsworth Road, Vauxhall, London, S.W.8.

Further details and application forms from the Clerk to the Council (Room 207), Polytechnic of the South Bank, Borough, London, SE1 0AA. Tel: 01-928 8989.

University of Warwick

STATISTICS LIBRARIAN

Applications are invited for a post of Senior Library Assistant in the Library's Division of Economics and Business Studies. The post involves regular work with academic and business enquirers in the Library's collection of economic statistics, one of the largest in the country. Experience in handling statistical and economic information is essential. Salary on the scale £1,641–£2,229 p.a. with the possibility of promotion to £2,676 p.a. The appointment will be with effect from September 1st 1972 or a date to be arranged. Applications in writing (3 copies), naming two referees should be sent to the Registrar, University of Warwick, Coventry CV4 7AL (from whom further details may be obtained). Closing date for receipt of applications is 7th July 1972. Please quote Ref. No: 43/2G/72.

'A Webster is a lovely thing, God wot'

The Guardian

And so are you if you ensure that your Merriam-Webster Dictionaries—there are six now—are up-to-date editions. Write or phone (01-405 0805) for advice.

6 Portugal Street London WC2

BELL

LIBRARY BINDING

This has been our trade since the last century, and in practising our craft we have given service to all types of libraries in many corners of the World.

We like to think we still bind books for libraries rather well, apart from our other activities as publishers and booksellers.

CEDRIC CHIVERS LTD
PORTWAY
BATH BA1 3NF

'Micropublishers, reader and retrieval system manufacturers, microform users – in fact, almost everyone connected with the micrographic industry – will find a valuable and convenient reference source in this book.'

Micrographic Weekly

Miniaturised Communications

A review of microform

B. J. S. WILLIAMS

Published by
THE LIBRARY ASSOCIATION
in conjunction with
THE NATIONAL REPROGRAPHIC CENTRE
FOR DOCUMENTATION

£1.50 (£1.20 *to L.A. members*)

British Technology Index

CURRENT SUBJECT GUIDE TO BRITISH TECHNICAL JOURNALS

FOR TRACING AND RECALL

of {specific / recent} information

in the Field of Applied Science, Engineering and Manufacturing Technology

Monthly Parts and Annual Volume

THE LIBRARY ASSOCIATION

7 Ridgmount St. Store St. London, WC1 7AE

(Phone: 01-636 7543)

INFORMATION RETRIEVAL & LIBRARY AUTOMATION

This monthly review is unique in its extensive U.S. and international coverage of the many specialized fields which contribute to improved information systems and library services for science, social science, technology, law and medicine; these fields include:

computer technology and systems, library science and technology, library administration, photographic technology and microforms, facsimile and communications, library and information networks, reprographic and printing technologies, copyright issues, indexing systems, machine-aided indexing and abstracting, documentation and data standards, databanks and analysis centers.

The *IRLA Newsletter* editorial staff reviews a wide range of sources to inform, digest and to give leads to further information. Books, research studies, government and technical reports, and foreign developments are noted. Useful conferences are announced and new products are described.

Subscription is $24 per year (overseas subscribers add $6). Orders and inquiries should be directed to

Lomond Systems, Inc., Mt. Airy, Maryland 21771, U.S.A.

First for carpets
Dodson Bull

UP TO 30% DISCOUNT
BRANDED CARPETS

Wilton ● Axminster ● Oriental ● Tufted ● All makes available with full Manufacturers' Guarantees ● NO IMPERFECT GOODS SOLD ● Free delivery in U.K. ● Expert fitting service available most areas.

£200,000 carpets on display
In our extensive London and provincial showrooms
Write stating requirements or for introduction to carpet showrooms in most main cities. Free brochure on request to Dept. ALB

DODSON BULL CARPET CO. LTD
LONDON: 5 & 6, Old Bailey, EC4M 7ID. Tel: 01-248 7971. **BIRMINGHAM:** 164, Edmund St., B3 2HB. Tel: (021)236 5862. **BOURNEMOUTH:** 268, Old Christchurch Rd., BH1 1PH Tel: 21248. **BRISTOL:** 2-3, Royal London House, Queen Charlotte St., BS1 4EX. Tel: 28857. **LEEDS:** 12, Great George St., LS1 3DW Tel: 41451. **MANCHESTER:** 55-61, Lever St., M1 1DE. Tel: (061) 236 3687/8/9. **NEWCASTLE-upon-TYNE:** 90-92, Pilgrim St., NE1 6SG. Tel: 20321/21428. **WESTCLIFF-on-SEA:** 495, London Rd., SS0 9LG. Tel: Southend 46569.
Open: 9.00-5.30 Mon-Fri. Sat. 9.00-12.00
(Manchester 9.00-4.00)

Advanced Technology Libraries

is a regular newsletter produced ten times a year as an understandable, easy to read, eight page information service.

Not every Librarian will read AT/L
. . . But maybe you should!

Now and even more so in the future—librarians are getting increasingly involved in the new developments of library technology:

How do you keep up? How do you know which developments have potential for your library? How do you choose new equipment wisely?

Do you fully understand these new technologies?

CABLE TELEVISION (CATV)
COMPUTER OUTPUT MICROFILM (COM)
TELEFACSIMILE (FAX)
ULTRAMICROFICHE (UMF)
MINICOMPUTERS
VIDEO RECORDING
COMPOSITION DEVICES
COMMUNICATION SERVICES
DIGITAL STORAGE MEDIA
LASERS AND HOLOGRAPHY
AND MANY OTHER NEW DEVELOPMENTS

Bring yourself up-to-date by reading the coverage of these innovations in forthcoming issues of AT/L.

Edited by Frances Spigai, and published by Becker and Hayes—a library and information science consultant and publisher: a subsidiary of John Wiley and Sons.

Send this coupon for a prospectus giving further details

To: John Wiley and Sons Ltd, Baffins Lane, Chichester, Sussex

Name..

Library ....

Address..

.... Date.....................

An Aslib Guide to
Information Sources

Value Added

THE TAX AND THE CONCEPT

compiled by D. S. BUCHANAN

This guide provides details of organizations which can supply information on VAT together with a survey of the documentation on the 'value added' principle that has been produced in the last ten years.

There are four main sections. The introduction explains what the value added tax is, how the VAT system came to be adopted and which countries use it. The second section lists organizations in Britain from whom information about VAT can be obtained. The third part consists of the bibliography, in which there are 155 references, covering general aspects of VAT, the proposed introduction of VAT in Britain, the experience of European and other countries in using this fiscal system, and the value added concept as a measure of company efficiency. The last section lists indexing journals which cover relevant material, and a list of periodicals cited, indicating those titles in which material can be found.

75p net; 60p to members *SBN 85142 041 9*

PLEASE SEND CASH WITH ORDER

Aslib Publications

26 SEP 1972

Published in England by Aslib, 3 Belgrave Square, London SW1X 8PL
Printed by Alden & Mowbray Ltd at the Alden Press, Oxford

Aslib Proceedings

incorporating Aslib Information

Intermediate languages for switching and control **ALAN GILCHRIST** 387

Some thesauric history **KAREN SPARCK JONES** 400

Some recent approaches to the study of meaning **K. M. PETYT** 412

Research and Aslib membership **B. C. VICKERY** 419

ASLIB · 3 BELGRAVE SQUARE · LONDON SW1

Aslib Proc. vol. 24 no. 7 pp. 379-433 London, July 1972

ON HER MAJESTY'S SERVICE

H.M.S.O. publish hundreds of reports, white papers, and pamphlets which have a direct effect on business, the professions, industry and learning. The Claude Gill Government Publications Department can supply a large selection from stock and orders for all H.M.S.O. items can be handled as part of your normal book requirements.

Also, don't forget that Claude Gill Subscriptions can supply your requirements for Government periodicals.

Claude Gill-
a name that speaks volumes

Claude Gill Books, 481 Oxford Street,
London W1R 2AQ Tel: 01-499 5664 Telex: 266538

Aslib Proceedings

incorporating Aslib Information

VOLUME 24 JUNE 1972 NUMBER 6

© 1972 Aslib and contributors

Aslib Proceedings: incorporating Aslib Information *is published monthly and supplied free to members of Aslib. Subscription rates are £10 annually to non-members, or £2.50 to Aslib members requiring additional copies. Single copies £1, or 25p to members.*

Further information about Aslib's services and membership rates will be supplied on application to the Director, Aslib, 3 Belgrave Square, London SW1X 8PL. Tel. 01-235 5050. Telex 23667; answer-back, Aslib London.

ASLIB CALENDAR 1972

September	
TUE.19.	Chemical Group evening meeting and lecture: 'ASSASSIN' by K. M. Bramwell (ICI Agricultural Division). Aslib. 5 for 5.30 p.m.
SUN.24–WED.27.	Aslib 46th Annual Conference, Ranmoor House, University of Sheffield.
October	
WED.18.	Aslib evening meeting: 'Electronic intelligent machines', by Dr Igor Aleksander (University of Kent). Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1. 5 for 5.30 p.m. Midlands Branch Junior Workshop: 'Co-operation, materials, systems and staff'. Technical College, Corby. 10 a.m.–4 p.m.
TUE.31.	Transport and Planning Group/LA RSIS one-day conference: 'Sources of information for leisure, recreation and tourism'. Library Association, 7 Ridgmount Street, WC1.
November	
WED.15.	Midlands Branch one-day conference: 'HMSO—its services and problems associated'. University of Nottingham. 10 a.m.–4 p.m.
TUE.21.	Aslib one-day study conference: 'Management in a service context'. 36 George Street, Manchester.
WED.22.	Aslib evening meeting: 'Summary of projects in hand by Aslib R & D Department'. Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1. 5 for 5.30 p.m.
December	
WED.20.	Aslib Christmas Party. Aslib. 5.30 p.m.

ASLIB INFORMATION

Results of Aslib Council elections

The following were elected to membership of the Council of Aslib at the Aslib Annual General Meeting held on 14th June 1972:

M. B. Line, M.A., F.L.A., A.I.Inf.Sc. (Librarian, National Central Library)
W. L. Saunders, M.A., F.L.A. (Director, Postgraduate School of Librarianship and Information Science, University of Sheffield)
D. Kennington, F.L.A., F.R.S.A. (Head of Information, Library and Publications, Department of Planning and Transportation, Greater London Council)
Miss D. H. Grose, M.B.E., B.A., A.L.A. (Chief Librarian, Consumers' Association)
D. J. Campbell, M.A., Ph.D., A.R.I.C., F.I.Inf.Sc. (Individual Member)
L. Corbett, M.I.Inf.Sc., A.L.A. (Deputy Librarian, University of Stirling)
J. D. Dews, M.A., F.L.A. (Librarian, Manchester Business School)
Miss K. M. Saunderson (Deputy Head, Technical Intelligence and Library, ICI Plastics Division)
F. A. Graham, A.L.A. (Group Librarian, Ferranti Ltd)

Of the 313 valid ballot papers returned,

Industrial and Commercial Members sent	153
Universities and Colleges	69
Public Libraries	42
Institutions and Societies	26
Public Bodies	12
Individuals	6
Government Departments	5
	313

46th Annual Conference, University of Sheffield

A distinctive feature of Aslib's 46th Annual Conference, to be held in Ranmoor House, University of Sheffield, from 24th to 27th September this year, is the exhibition of external information services that will run concurrently with the Conference.

This exhibition—something of an experiment—is completely integrated into the main theme of the Conference, which is concerned with the use of external information services to improve internal information services and their impact on special libraries and information units. No discussion of this subject can be complete without a confrontation of users and suppliers in an atmosphere that is not so much a 'hard sell' as a thoughtful look at what the customer needs and what exists—or can be adapted—to meet his requirements. Many of the leaders in the field, including Anbar Publications, BHRA Fluid Engineering, Barbour Index, Commonwealth Agricultural Bureaux, CO-PAC

Index, CRC Information Systems, DTI Technology Reports Centre, Information Retrieval Ltd, INSPEC, ISI Europe, NRCd, PSTIS, Sheffield University Biomedical Information Project, Thomson Data, UKCIS and Zoological Record, will be exhibiting at the Conference and it is hoped that they will find the occasion fruitful, both in the short term, in extending their custom and, more important, in the long term in improving the role they can play in the information and communication field.

Attendance at Sheffield is likely to be good. There is a busy social programme and a wide choice of visits of professional, and other, interest. If you have not already secured your place, apply to the Conference Organizer, Aslib, 3 Belgrave Square, London SW1X 8PL.

Public Lending Right

Many members will already have seen the Report of the Working Party on Public Lending Right (HMSO, 30p). The working party, which included representatives of the Library Association and of local authorities, but not of industry, was not required to make recommendations for the introduction of a Public Lending Right nor to consider whether such a scheme was right in principle, but only to suggest how such a scheme might work in practice. In other words the report is a feasibility study rather than a set of proposals for action.

Starting from somewhat debatable definitions of the words 'lending' and 'public', the working party concluded that, logically, such a right, if it existed at all, would apply to all kinds of documentary material and to all kinds of libraries (including special libraries in industry) except privately owned and personal libraries, although it is pointed out that in the case of some kinds of documents (e.g. periodicals) and some types of libraries, there would be considerable practical difficulties.

The report is published for discussion and comment and is under consideration by the appropriate committee of the Aslib Council with a view to submitting observations to the Government on behalf of members' interests. Aslib is also consulting with the Library Association on the matter. The Government has asked for comments by 18th September. Meanwhile members who have any specific point to which they wish to draw attention are invited to write to the Director of Aslib.

Aslib consultant seconded to FAO

Harry East, of Aslib's Research and Development Department, has been seconded as a consultant to the Food and Agricultural Organization (FAO) of the United Nations, and will spend the next two years working at its Rome headquarters. This has been made possible by the award of a special grant to Aslib by OSTI.

Mr East will be working on the testing and implementation of the Level 1 phase of the international information system for food and agriculture (AGRIS). In 1970 an Advisory Panel of Experts of the FAO, on the advice of its Study Group (led by Dr Herbert Coblans, another Aslib consultant), recommended the setting up of the AGRIS system at two levels. AGRIS Level 1 would be a current-awareness bibliography service covering all the subject fields within the FAO's area of responsibility. AGRIS Level 2 would consist of a network of specialized information services, each with responsibility in depth for a particular subject field.

Last year Mr East acted as the Co-ordinator of a study team of nearly forty specialists, divided into three working groups meeting in Paris, Luxembourg and Rome. This involved him in over 20,000 miles of travel during the year. The main priority of the team was to produce a design for AGRIS Level 1, and its report, compiled by Mr East, was submitted to the Director General of the FAO in September 1971 (AGRIS. Study Team Report. Rome: Documentation Centre, FAO (FAO/DC/AGRIS 2), September 1971).

The study team envisaged that the system would consist of a network of collaborating regional and national bodies, with a co-ordinating centre which would be responsible for the management of the system, including the production of magnetic tape and printed outputs. Decentralized services at the regional or national level would be developed for the dissemination of information, retrospective searches and the production of special bibliographic services.

In November 1971, the FAO Conference adopted a resolution approving FAO sponsorship of AGRIS, and requested the FAO to seek further support for the rapid development of Level 1 from interested bodies and institutions, including member governments; to make detailed technical preparations with a view to starting a limited service in 1973; and to continue the study of AGRIS Level 2.

One of the contributions of the UK government has been to award a special grant to enable Mr East to work full time for two years on the development of Level 1 services.

New editor for *Program*

Members will be sorry to hear that Mr Richard Kimber will be relinquishing the editorship of *Program* at the end of this year, after occupying the editorial chair since the foundation of the journal in March 1966.

His successor, to whom we extend a warm welcome, will be Dr R. C. Young, Assistant Librarian responsible for automation at the University of Sussex, who has been closely involved with the development and installation of the successful computer-based circulation system in that library, based upon Automated Library Systems equipment. Dr Young is already well known to members of the Aslib Computer Applications Group.

Since the first issue of four pages, *Program* has established itself as a major journal in the field of computer applications in libraries and information units. Limited originally to 'housekeeping' aspects of the sublect, its scope has been widened to include information dissemination and retrieval in libraries of all kinds, and is no longer confined to British studies, although it still acts as a medium for reporting on the work of the Computer Applications Group.

Much of the success achieved by the journal is attributable to Richard Kimber's own energy and enthusiasm; fortunately his knowledge and experience will not be lost to us since he has agreed to become the first chairman of a small Editorial Board, which is being created to assist the editor, and which will include Mr R. E. Coward, formerly Head of Research at BNB and now with the Planning Secretariat of the British Library, Mr P. Vickers of the Aslib Research Department, and Mr C. W. J. Wilson, Librarian, AERE Harwell.

HMSO Services Working Party

Aslib has accepted an invitation to join a Working Party set up by the Library Association and HMSO to discuss relations between librarians and HMSO, and in particular to assess the services provided by HMSO with a view to improving those areas which librarians feel are inadequate.

Mr G. D. L. Paterson, Librarian of Burmah Oil Trading Ltd, has kindly agreed to represent Aslib on the Working Party. If any member wishes to discuss any matters with him relating to HMSO and its services, he can be contacted at Burmah House, 57 Chiswell Street, London, EC1Y 4SX.

Unesco symposium of editors of documentation, library and archives journals, Paris, 16th–18th May, 1972

The Department of Documentation, Libraries and Archives of Unesco convened this meeting to discuss ways of reaching closer co-operation and co-ordination between editors of professional periodicals. There were sixty-four participants from thirty-one countries, including nine from the United Kingdom. Mme S. Honoré (France) of the Bibliothèque Nationale and Mr E. P. Dudley (UK) were elected Chairman and Rapporteur respectively.

The following is a selection from some of the recommendations accepted and some matters on which there was general agreement in principle:

(a) Editors are urged to accept and use the standardized title, the abbreviation and the International Standard Serial Number (ISSN) for each periodical, as formulated by the International Serials Data System at its Centre in Paris, in collaboration with ISO and the competent national body.

(b) Since most publishers seem to ignore the internationally agreed ISO standards for the presentation of periodicals, Unesco was asked to arrange for the preparation of a practical guide to these standards, presented in such a way that their purpose and justification (giving illustrative examples) are made clear. Further, the distribution of this guide should be actively promoted and it should be brought to the attention of editors in the three fields all over the world.

(c) Unesco should support a statistical study of the primary literature in the field and the findings should be related to a comparative study of the major abstracting and indexing services. Based on the conclusions a study should be undertaken to determine the feasibility of a world indexing and/or abstracting network.

(d) Unesco should investigate the possibility of extending the practice of publishing in the original periodicals abstracts of the articles in at least one of the widely known languages (other than the language of the article).

A statistics library in the Midlands

Industrial and business organizations needing data for market research and planning have for many years depended largely upon the Statistics and Market Intelligence Library at the Department of Trade and Industry. However, the rapid development of economic and business studies at the University of Warwick has led the Library there to establish—with the help of SMIL, the British Museum Library and the Nuffield Foundation—a statistics collection which could be used not only by academic research workers, but also by a large number of industrial users in the area. The collection has now been opened officially to industrial users on a subscription, but non-profit-making, basis. The Library is confident that industrial firms in the area will find it not only convenient, but more economical, to use a collection which is easily accessible by car.

Further details of the scope of the collection and the subscription costs are available from the Librarian, P. E. Tucker, University of Warwick, Coventry CV4 7AL (Tel. 24011).

Personnel problems and staff relationships

From 15th to 18th September the College of Librarianship Wales is holding a second residential seminar in its 'New Perspectives' series of annual short courses, which are designed to meet the continuing educational needs of young librarians a few years out of Library School.

This year's seminar is entitled 'Personnel problems and staff relationships' and will consider the role of the young librarian as a manager, as a member of a team and as a trainer of subordinate staff. Speakers will include John Allen (Chief Librarian, Brighton Public Library), Kevin McGarry (Senior Lecturer, CLW), Ross Shimmon (Research Assistant, CLW), Philip Whiteman (Head of Department of Management Studies, CLW). The Course Director is Ron Edwards, Senior Liaison and Training Officer at CLW (Llandbadarn Fawr, Aberystwyth) from whom further details can be obtained.

Universal Bibliographic Control

A project to establish an integrated world-wide system for the exchange of bibliographic data—Universal Bibliographic Control (UBC)—is being undertaken by a Working Party of the International Federation of Library Associations (IFLA). The Working Party consists of the Chairmen of the IFLA Committees on Mechanization, Bibliography and Cataloguing.

To discuss the concept of UBC a Symposium will be held in London in November this year. Further details are obtainable from the organizers, the IFLA Committee on Cataloguing, Department of Printed Books, The British Museum, Great Russell Street, London WC1.

Patent Information Retrieval

The Du Pont Company recently announced the sale of rights to its system for machine retrieval of patent information to the IFI/Plenum Division of Plenum Publishing Corporation, Washington, DC.

Under terms of this agreement, Plenum will use the Du Pont patent information retrieval system to augment a patent information service now marketed through IFI/Plenum Division. IFI (Information for Industry) currently has about two hundred customers for its patent information retrieval services among US and foreign chemical companies. The Du Pont Company's system provides machine access to a file of approximately 140,000 US patents issued since 1964, covering composition of matter, mixtures of chemicals and chemical processes of interest to Du Pont.

IFI is now merging the Du Pont system into its present data base, which includes over 275,000 US chemical and chemically related patents issued since 1950. For further information contact R. G. Paterson, Public Relations, Du Pont (UK) Ltd, Du Pont House, 18 Bream's Buildings, Fetter Lane, London EC4 1HT (Tel. 01-242 9044).

Eighth Collective Index to *Chemical Abstracts*

The first computer-produced collective index to *Chemical Abstracts* has begun to come off the presses. The initial volume of the Eighth Collective Index to *CA* was mailed to subscribers late in May, and Chemical Abstracts Service expects to have the entire index—an estimated 80,000 pages in 46 volumes—in subscribers' hands before the end of 1973.

While the Eighth Collective, which covers the years 1967 to 1971, will be about twice the size of the Seventh Collective (1962–66), it will be completed in about half the time. This telescoping of the publication schedule results from a new production system developed by CAS with major support from the National Science Foundation.

Further enquiries should be addressed to The Chemical Society, Blackhorse Road, Letchworth, Herts. [See also Letter to the Editor, pp. 423–4.]

BRIEF REVIEWS

GILBERT, L. A. *and* WRIGHT, J. W. Non-book materials: their bibliographic control. A proposed computer system for the cataloguing of audio-visual materials in the United Kingdom. London: National Council for Educational Technology, 1971. 92 pp. 90p. (SBN 900313 21 8)

This report is a contribution to the wider National Libraries ADP Study which is due to appear later this year. In this way it can be seen as a blueprint in the planning of the British Library in this somewhat confused area of non-book materials. The authors have consulted some forty organizations in the UK involved in the field and have worked closely with the British National Bibliography. In a complex situation where there is no copyright deposit, no comprehensive national collection nor catalogue, the important recommendation is made that there should be a single national printed catalogue (computer-aided in production) of all non-book materials available for educational use in the UK.

PATRINOSTRO, S. A survey of automated activities in the libraries of Great Britain and the Commonwealth countries. Tempe (Ariz.): LARC Association, 1972. 89p. $15.00. (*A survey of automated activities in the libraries of the world, vol. 2.*)

This is the second volume in the LARC Association's twelve-volume series which is intended, when completed, to cover automated activities in the world's libraries. This particular volume records 102 projects in the UK, Canada, Australia, India and New Zealand, and also, anachronistically, Eire and South Africa. Each system is briefly outlined and details are also given of the type of personnel employed, the name of the project co-ordinator, the equipment used and references in the literature.

These entries are supported by indexes to the activity automated and to the type of library, and by a statistical analysis of the survey returns.

The final section comprises reviews of the circulation system in the McPherson Library, University of Victoria, and of the serials system in the library of Canadian National Railways. To these is added a two-page summary of the survey of British university libraries carried out by the Aslib Computer Applications Group. Just why these two Canadian projects were singled out for fuller examination seems obscure.

Intermediate languages for switching and control

Alan Gilchrist

Consultancy Section, Aslib Research and
Development Department

Paper presented at the Annual Conference of the Co-ordinate Indexing Group, Churchill College, Cambridge, 12th–14th April 1972

Introduction

When I was asked to give this paper, I was unaware that the title of the Conference was 'Words and Meaning'. While I warmly welcome this theme, I must admit that it gave me rather abruptly a feeling of nervous awareness of the problem of associating words with meaning. I began to read things twice and look for alternative interpretations; and when I received the registration form for this conference I experienced a feeling of near panic when I was asked to answer the question 'Will you be eating lunch on Wednesday the 12th of April?' How difficult it is to verbalize concepts, especially in subject areas such as ours which contain so many abstract notions that one is sometimes guilty of trying to avoid being too precise. I am reminded of the professor, who when asked the question 'What is electricity?' replied 'It all depends what you mean by "is".'

Specifically, I was asked to give a paper on the problem of switching between index languages, with particular reference to the Intermediate Lexicon project. When one reads the literature on and around this topic, two things become apparent: firstly, that it is an elusive problem and that the arguments tend to be circular, and secondly, though there is quite a lot to read, it is all theoretical, and nobody so far has established a switching mechanism, let alone investigated its effectiveness. In this paper then, I shall confine myself to painting a light-hearted picture of the word-concept problem, to reviewing relevant work and to discussing briefly some of the problems that will have to be considered if effective switching is to be made possible.

Richness and complexity of language

It is an extraordinary feature of our language that its richness, its complexity, and its diversity is based on such a small code base. In the English language we have an alphabet of 26 signs (of which in fact only 23 are effective). Even the phonetic alphabet, as in the 'initial teaching alphabet', employs only 44 phonemes—12 vowels, 9 diphthongs and 23 consonants. Yet in combination these few letters and phonemes generate a colossal vocabulary. I am not going to get involved in a pedantic argument concerning the precise definition of a word, but the *Oxford English Dictionary* contains half a million of them. The average individual has a surprisingly large vocabulary. It has been estimated that 'A person's active vocabulary in conversation is 2,000 to 3,000 basic words and in writing about 10,000. This compares with an inactive vocabulary of words he knows and recognizes of 20,000 to 60,000 and perhaps 100,000 derivatives of these.' And we cannot stop here because the words are built into standard phrases. Goodness knows how many of these there are, but it is interesting to note that though the *Thesaurus of Engineering and Scientific Terms*[1] contains 23,364 terms, these are generated from only 13,012 unique words. Now *OED* is English and *TEST* is American, and in case anyone still thinks we talk the same language, let me read you part of a letter published in *The Guardian*: 'When I am in Britain, I have a car. It has a bonnet, a boot, a windscreen, wings and a silencer. I run it on petrol and I drive on the road. When necessary I mend a puncture. When, as sometimes happens, I am in North America, I have an automobile. It has a hood, a trunk, a windshield and a muffler. I run it on gasoline and I drive on the pavement. When necessary I fix a flat'.

So far I have mentioned only the labels that English speaking peoples stick onto their concepts, but as you know concepts tend to be elusive things and so people are always striving to find better labels, better words to express concepts; and all the time they are trying to create new concepts and to find new, or often old and homographic, words for them. Current trends in English show that the most common additions to the language are verb–adverb units used as nouns, such as 'show-down' and 'hold-up'; compounds such as 'road-block' and 'news-value'; abstract nouns used as verbs such as 'to condition' and 'to service'; acronyms and abbreviations; and of course more and more slang.

To make matters worse conceptualization is a personal thing and each person's view of the universe is unique and so requires a different word-set to express that viewpoint. At one end of this range one finds Einstein who, discussing his discovery of the theory of relativity, is quoted as saying: 'These thoughts did not come in any verbal formulation. I rarely think in words at all. A thought comes and I may try to express it in words afterwards'. At the other end of the scale one finds the quaint over-verbalization of Pidgin-English: for example, in New Guinea a piano is referred to as 'Him big fella, you hit him in teeth him sing'. The way in which words are worked in order to present new meanings and insights is staggering. Consider the opening of this INSPEC abstract: 'Integral equations of the Watson-Faddeev type, developed in the context of few-body non-relativistic scattering theory, are shown to play an important role in the structure analysis of many-body Green's functions.'

And now the first three lines of a poem by Dylan Thomas:

Foster the light nor veil the manshaped moon
Nor weather winds that blow not down the bone,
But strip the twelve-winded marrow from his circle

Neither of these passages contains one word to which I am unable to attach a meaning, but I for one have not the slightest idea what either passage means. So, as indexers, we may have to dig pretty deep for the underlying concepts: as Vickery[2] has said: 'indexers must "understand" a document—their understanding being shown perhaps by their ability to formulate its subject in words that differ from those used by the author'.

But before leaving the topic of the relationship between words and concepts, it might be wise to add a word of warning about the emotive power of words, which can prevent people from altering their mental classification system. Freud had a story about a Viennese doctor who, angry with the young psychologist's ideas, snorted: 'But, my dear Sir, how can you talk such nonsense? Hysteron [*sic*] means the uterus. So how can a man be hysterical?' More relevant to this paper is the situation of a news-cuttings library I have recently been looking at. In this library, recall and precision are relatively unimportant and response time is by far the most important user criterion. The indexers do not have the time or the breadth of subject knowledge to work at the conceptual level and are obliged to file clippings directly under appropriate keywords. The creation of 'journalese' is, I suspect, somewhat akin to indexing, and this system seems to suit the journalist. The words he uses are often quite powerful and concise labels, often with useful temporal connotations, for example the current 'permissiveness' and the term 'austerity' which is almost uniquely associated with post-war shortage.

To summarize this section: as indexers we should take note of Wittgenstein's maxim 'Don't look for the meaning of a word, look for its use'.

Indexing languages

That word usage will tend to be localized is reflected in the following remarks made by Klingbiel[3] in favour of local and tailor-made indexing languages: 'the documentalist is not at all concerned with the possible meanings which occur in his collection. Moreover, he is charged with the responsibility of storing and retrieving the segment of man's knowledge represented by his library.'

Today his argument is reinforced by the vast number of existing indexing languages. The Bibliographic Systems Center at Case-Western Reserve University, Ohio, now holds about two thousand indexing languages in the English language alone. These, being published or semi-published, the real number will be far higher and this is borne out by the recent survey undertaken by Nightingale[4] for the Aslib Co-ordinate Indexing Group, which showed that forty-nine systems out of a sample of sixty-two had developed their own thesaurus. But now, ten years after Klingbiel's remark, there are three powerful factors which are in direct conflict with this fragmentation:

(1) *Economics*. Studies in several documentation centres have shown that some 60 per cent of scientific information bulletins are analysed and often abstracted simultaneously by several such centres[37]. It is the argument of the Intermediate Lexicon Project, to which I shall be referring later, that such duplication of effort could be reduced by the use of a switching mechanism.

(2) *Networks*. The recent rapid growth of interest in international exchange schemes such as UNISIST, INIS, AGRIS, and EUDISED necessitate compatibility between co-operating centres.

(3) Commercially available data-bases. A study by the National Agricultural Library of America,[31] to which I will also be referring later, had as its objective 'To develop a means of transferring index entries (i.e. document

> surrogates in an index) from an external data base index to the NAL data base index with as little intellectual effort as possible. At the same time, the quality of the converted index terms must be adequate to retrieve surrogates in the integrated NAL system without a decrease in the level of retrieval performance.'

To these three factors might be added a fourth, the perennial problem of re-classification, and this is an area in which early work on switching was conducted.

Compatibility and convertibility

Reading through the literature relevant to the subject of this paper one comes across the terms compatibility, convertibility, standardization, reconciliation, alignment, concordance and switching, and perhaps it might be useful to say a word or two about these ideas.

Hammond[9] says that compatibility is 'the ability of one information system to accept the original indexing and abstracting data of another information system for any given subject coverage that is common to both systems', but as Angell[10] points out, the active aspect of this capability is convertibility which 'implies the use of some kind of manipulation to make the results and products of processing in one system usable in another'. Successful convertibility will thus depend on the compatibilities between systems, procedures, collections, indexing languages, indexers and users, problems to which I shall return later. But now let's look at how standardization, reconciliation, alignment and concordance can assist compatibility and convertibility.

Standardization

Powerful arguments are still being put forward in favour of one master language or framework. Lloyd[12] has argued that the UDC provides a suitable standard for switching in his statement that 'the many proponents of special classification and thesaurus-type subject lists, which may be excellent and efficient in their own areas, cannot be expected to abandon these in favour of one standard classification . . . but they may well agree . . . to accept one standard "switch" language, with which they can establish a concordance.' More recently the Classification Research Group[13, 14] has proposed the construction of a new general classification, based largely on the argument that a large number of faceted schemes already exist, each with a fringe area which is somebody else's core. Wahlin[15, 16] has proposed a two-tier system which he calls the AR complex—A for Adaptation and R for Reference, where the Reference System could, for example, be the UDC and the Adapted Systems a series of satellites superimposed on the reference system. However, these are so far only proposals and, after Dewey, Library of Congress and UDC, probably the most successful attempt at standardization has been that promoted by the Engineers Joint Council[17]. Whatever opinions one may have about the quality of the EJC *Thesaurus* and its successor *TEST*,[1] they have helped to generate a number of compatible thesauri. Some of these are subsets or microthesauri and some, like the *Thesaurus of Textile Engineering Terms* are elaborations of subsets.

Conversion methods

Concordance between notations

Adopting one standard indexing language may be feasible for the new library but of course many older libraries are unable to change from the scheme they originally chose. Perreault[18] has enumerated some of the difficulties (and he is careful to say these are not necessarily impossibilities) in establishing direct concordance between classifications. His article was prompted by another by Henshaw[19] who was being perhaps too optimistically enthusiastic about the possibility of constructing conversion tables between the Library of Congress and Dewey classifications. The extreme difficulty of establishing algorithms for conversion has been demonstrated for example at BNB. Here the indexing is done first and then the class-marks from the various classification schemes are allocated. The material so produced prompted the obvious question of whether conversion rules could be established. I am told that even conversion from the 16th edition of Dewey to the 17th was found to be too difficult—at least with the effort available at that time.

Concordance between notation and term

Worth mentioning at this stage are various proposals put forward to promote compatibility between part of a classification scheme and a thesaurus. This could produce a tool somewhat similar to the *Thesaurofacet*[42] in which the thesaurus component can be regarded as the alphabetic subject index to the classified schedules. Research into this possibility was described by Stueart[25] who has looked at UDC and the EJC *Thesaurus*; concluded that UDC could be effectively used as a term system, and proposed that the two systems should co-ordinate their terms.

Concordance between terms

An early example of effort in this direction was the huge exercise conducted by Datatrol Corporation[26, 27] in which the vocabularies of the Atomic Energy Commission, the Defense Documentation Center, the National Aeronautics and Space Administration and the Office of Technical Services were merged into one sequence, each term being assigned to a field and a group similar in scale to the COSATI Subject Category scheme.[28] This allocation was done intellectually and each group was compared to groups formed by statistical association in usage. A similar exercise has been conducted more recently in the production of the OECD's *Aligned List of Descriptors*.[29] This exercise has combined the vocabularies of the International Labour Office, the International Committee for Social Sciences Documentation, the Deutsche Stiftung für Entwicklungslander, the Food and Agricultural Organization and the Organization for Economic Cooperation and Development itself. Again the terms have been allocated to broad classes and in addition most terms are presented in English, French and German. This can be regarded only as a first step towards rationalization. For example, we find in the group on 'Documentation' the three terms: 'Documentation Center', 'Information Service' and 'Library'; and in the same group another three: 'Exchange of documents', 'Information exchange' and 'Information transfer'—with no indication of the scopes of these terms.

An advance beyond alignment has been suggested and developed by Neville[30] who uses the word 'reconciliation'. Clearly, this approach involves a lot more work and fairly deep analysis, but the dividends are likely to be correspondingly greater. In studying a set of thesauri in the same subject field, Neville has identified eleven main ways in which corresponding terms in different thesauri may differ, and he has suggested procedures for coping with their reconciliation. I understand that work is fairly far advanced in the reconciliation of the Building Research Establishment thesaurus and a larger one belonging to a French organization. One problem arising from the disparate levels of specificity of the two thesauri is that the English indexer is obliged on occasion to index by a generic term from the BRE thesaurus and, from further examination, by more specific terms from the French thesaurus. Whereas Neville examined the possible relationships between corresponding terms in different thesauri with a view to establishing a common coding system, work undertaken at the National Agricultural Library has attempted to devise an algorithm by which terms may be converted from one vocabulary to another. An interesting report on this project[31] reviews alternatives, objectives, and problems. The alternatives were considered to be:

(a) A manually devised vocabulary to cover the subject terms of interest to NAL for both their internal information system and all incoming data bases. This was rejected because of the huge expenditure of time and money.
(b) A merged vocabulary in which all terms would be listed with no effort to relate terms, exclude errors or allow for varying vocabulary conventions. This was rejected because of the unmanageable size of the vocabulary—it was estimated that its size would probably exceed 500,000 terms.
(c) A rationalized merged vocabulary in which a computer would be used to match all incoming data base vocabularies to terms in the NAL collection. This was rejected because of the high loss of synonyms, near synonyms—in general, terms meaning the same but in different form or format.
(d) This left the vocabulary conversion algorithm which when constructed contained 42 steps (13 of which require intellectual rather than clerical effort), and the authors of the algorithm have listed 92 significant routes through the algorithm.

Though this is an impressive report, it is unfortunately difficult when reading it to determine the degree of subjectivity likely to be exercised in the intellectual steps and the example of term conversion used in the report ends by admitting that another decision could have been made at one crucial point.

All the projects I have outlined so far have been concerned with the direct comparison of two or more schemes. It was as long ago as 1965 that Gardin and Lévy of the Groupe d'Etude sur l'Information Scientifique convened a meeting in Marseilles to discuss their proposals for the compilation of what was then variously called a mediating indexing language, an intermediate indexing language, a switching language and now, in its English version, an Intermediate Lexicon. At this first meeting the working party was able to overcome linguistic and socio-cultural difficulties and arrive at a list of twenty-five groups or main divisions. A second meeting in 1968 took this work further and a full English translation, produced by Anglo-American effort appeared in 1969.[33] The principle of the Intermediate Lexicon is that it aims to provide one central mechanism for a network of exchanging centres: 'Instead of employing as many sets of equivalence tables as there are pairs of indexing languages in the network, each centre constructs a single equivalence table between its own "local" indexing language and the "neutral" switching language.'[38] Then, each centre records on each indexed document, not only the notation or terms from its own language but, by consulting its own concordance, the notation from the Intermediate Lexicon. The other centres receiving such documents translate the notation from the Intermediate Lexicon into their own indexing languages. Of course, this sounds far simpler than it is in practice, and much work needs to be done to extend the Lexicon; to devise the best format for it, and to test its effectiveness. To these ends OSTI awarded a grant last year to the School of Librarianship of the Polytechnic of North London and this project has now reached a critical and interesting stage. It is a basic assumption that the Lexicon need not be a classification, but that its compilation will require classifactory techniques and that its presentation in classified form could aid the user to understand the meaning and context of each concept listed. A first draft of the Lexicon in scheduled format has just been completed, and it employs a somewhat unusual approach. In effect the terms have been stripped of their possible special contexts and presented as 'neutral' units. As a result many concepts are listed as being of general interest before those concepts are listed which are of interest only to the profession of library and information science. Thus, books as books, paper, copyright, are all topics of general interest, and it is only when one nears the end that one arrives at concepts such as 'descriptive cataloguing' that are peculiar to library and information science (even this can be argued, but the principle is displayed by the order, rather than by any line of demarcation). The syntax is supplied by a schedule of generally applicable formulae which include such relational indicators as 'comparison' and 'influence' and role designators which can be used to change the status of a concept either by broadening its context or by changing its semantic status. While the draft Lexicon was being produced, the team was also collecting indexing languages in library and information science (an interesting exercise in itself) and testing of the Lexicon as a switching device is due to start when the concordances have been compiled. A series of tests have been devised which will investigate the problems of switching into and out of the Lexicon and from and to both pre-coordinate systems.

Whereas the Intermediate Lexicon is a mechanism acting like a switchboard at the centre of a network, an idea put to the Department of the Environment envisages a control mechanism which would stand apart from, rather than between, various classification schemes and thesauri. It would be used to control their evolution and at the same time to provide various tools for use in the construction industry. The Department of the Environment has for the past few years been supporting a project concerning what they have called 'data co-ordination'. A final report has recently been submitted[39] and a number of subsidiary reports are currently appearing. One report[40] suggests that the construction industry requires a 'system of related classifications'. The particular problem of information handling in the construction industry arises basically from the fragmentation of the industry. Thus, central government, local government, consortia, and a large number of architects, civil engineers, quantity surveyors, consultants, contractors and specialist subcontractors (a recent project employed ninety-eight of these) all have to maintain their own information systems and all attempt to communicate effectively when brought together on a project. Each operates three types of inter-related information system:

(1) A system handling general information, contained in books, journals, standards and trade literature.
(2) A system handling project information—the drawings, specifications, bills of quantity generated for a particular project. (*Post hoc* analyses of this information then becomes part of the general information system.)
(3) A system handling management information.

Over the years a number of conventions have appeared and evolved, designed to support one or several activities in one or more of these systems. One of the principle recommendations of the DoE report (based on 'a continuous creation' rather than a 'big bang' philosophy) is that these various conventions and future schemes should be encouraged to converge towards a greater state of compatibility. The report also recommends that all further work in data co-ordination should be based on a fundamental subject analysis of the concepts of the industry. One tangible product of the DoE's support has been the *Construction Industry Thesaurus*[41] compiled at the Brixton School of Building (now part of the Polytechnic of the South Bank). It is this thesaurus which is seen as the basis for the control mechanism which is known provisionally as the 'metasystem'. The *Construction Industry Thesaurus* is similar in format to the *Thesaurofacet*[42] and the subject analysis has produced a flexible and unbiased classification of the concepts to be found in the building process. At the same time it is recognized that this fundamental approach will not satisfy many users and activities where different groupings and concept strings are required. The strategy would be to invite compilers and revisers of conventions to examine their objectives and to compare the terminologies of their schemes to the metasystem, and to use preferred terms, co-ordinations and relationships where possible. At the same time new concepts, terms and relationships would be added to the metasystem, appropriately coded as to source. It is hoped that this exercise can aid communication through some degree of standardization without putting severe constraints on the 'subsystem'. In addition, it should be easily possible to extract subsets from the metasystem if and as required. One such subset would of course be the *Construction Industry Thesaurus* itself. As an example of its possible two-pronged approach, a suggestion has been put to DoE which could help to rationalize trade literature. A draft British Standard contains the recommendation that, in addition to the accepted practice of allocating a filing code from the CI/SfB classification, keywords be allocated from the *Construction Industry Thesaurus*. Now in its present form, it is unlikely that the majority of manufacturers would be capable of producing effective indexing, and the suggestion is that a subset of relevant terms be extracted and displayed in the form of an algorithm, leading from product types to applications, materials and primary properties. As an extension of this it should be possible to use the subset for the selection of standard phrases for the title and the paragraph headings of the document itself. It is also hoped to investigate the possibility of producing the basic retrieval thesaurus at different levels of pre-coordination, suitable for computer use or the more economical feature card. The thesaurus is currently being put onto magnetic tape which will facilitate clerical handling.

Problems

Some of the problems to be encountered in switching have been succinctly argued in a study undertaken by Aslib.[5, 6] This study was presented to the International Council of Scientific Unions as part of the world science information system (UNISIST) feasibility study and it compared existing general classifications and thesauri. The study, not surprisingly, demonstrated the diversity apparent in such schemes and concluded that no existing general scheme would be a satisfactory source for specialist use. The addendum to this study addressed itself to the specific question 'How could individual bibliographic units in science information systems be so labelled as to facilitate their use in other systems that might differ as to discipline, mission or scope?' This question was approached by looking at the typical structure of a bibliographic unit in an intermediate document. It was shown that such a unit is usually in three parts:

(1) The citation: a bibliographic description with or without abstract.
(2) Search keys: catalogue or index terms, descriptors, class numbers etc., that are used as keys to search for individual units. The keys may be taken from document texts or their abstracts or from a standard terminology.
(3) Grouping and sequencing keys: in any intermediate document in which units are meaningfully arranged, each unit must be labelled by, or at any rate assigned to, a particular group.

Furthermore, it was stated that in many intermediate documents there is no explicit relation between the search keys and the grouping keys. A problem arises, therefore, when one wants to draw together into a new group, units from a number of existing groups. The report says that 'the only possible way of doing this clerically, with the usual type of bibliographic unit, is to define the new group as the sum of certain search keys, and to draw together all units labelled with those keys'. It further says that these sums must usually be formed *ad hoc*, and goes on to consider the four questions:

1. How can incompatible keys be reconciled?
2. How can regrouping within a system be facilitated?
3. Can solutions to this problem facilitate transfer between systems?
4. Can existing general schemes contribute to these solutions?

The report ends by listing the alternative possible solutions and what each could achieve:

1. Each system uses its own search and grouping keys, and does not relate these keys to each other or to those of other systems. Alternative groupings within each system can be realized only by *ad hoc* summation of search keys. Translation is effected via a *concordance*.
2. The same situation as (1) but an *intermediate lexicon* replaces the concordance with the same problems but with the advantage that each target system needs to compile only one concordance.
3. Each system uses search and grouping keys drawn from its own hierarchical classification. This is the same as situation (1), but concordances or intermediate lexicons can now switch at different levels.

4. Each system uses search and grouping keys drawn from a *standard classification* such as UDC. Transfer is in theory straightforward but alternative groupings must again be effected *ad hoc*.
5. Each system uses search and grouping keys drawn from its own generic thesaurus. Now alternative grouping is made simpler but a concordance is necessary.
6. Each system uses keys drawn from a *standard generic thesaurus*. Regrouping is further facilitated and translation is unnecessary.

The report concludes that this last alternative deserves more detailed examination and so we appear to have come full circle, back to standardization, at least as far as the UNISIST study is concerned.

I should like to conclude with a few more problems concerning switching and compatibility which occurred to me most strongly in preparing this paper.

1. *System compatibility*. I think any organization contemplating accepting indexing decisions from another should compare the objectives of the two organizations. For example, it is a function of a conventional 'store-house' library to arrange its material in a way which is consistent with the general consensus. On the other hand, the information service of a specialized information centre must be alive to the changing patterns of knowledge in its own particular and advanced position. (It is a function of the research scientist to formulate new structures and to make creative leaps across subject boundaries in his attempt to promote understanding of his subject.) A second difference between systems concerns the level of performance, or particular mix of criteria, that each system has chosen for its retrieval sub-system. This will be reflected partly in the degree of specificity or generality chosen for its index terms and whereas it is possible to generalize from the specific, it is clearly impossible to derive specific indexing from indexing at a more generic level.

2. *User compatibility*. There is perhaps a growing interest in libraries to attempt to provide different services and different levels of service for different user groups. This is one of the advantages of post-coordinate indexing. Again the problem is seen in the degree of specificity of the language, so that language A may appear to contain ambiguity to the user of language B, and language B may appear to contain redundancy to the user of language A.[7]

3. *Procedures compatibility*. Here one finds perhaps the worst problem of all and this is indexer consistency. It is a well observed fact that inter-indexer and even intra-indexer consistency can be damagingly low. To add a further translation via a concordance or two via an intermediate lexicon could further aggravate a weak link in what is already a fairly long chain of tasks. The three main steps of indexing:

(a) reading and understanding
(b) selecting that which is relevant
(c) translating into the system's indexing language

all require considerable intellectual effort—a fourth and possible fifth step is likely to introduce more noise (unless, as has been argued, the switching mechanism itself is so well organized as to aid consistency).

Relevant to considerations of indexer performance is a property of indexing language which Watt[8] has called 'habitability'. He illustrates this concept by asking (and this is in the context of conversing with computers) 'whether or not, in conversing with the machine (or system) on allowable topics, people will be able to "stay within" the limits of the (system's) sublanguage. In a term, will people find that sublanguage habitable'.

Now it seems to me that this manifests itself in indexing by the tendency of the indexer to select the best match available in the language, and that this may be done as much by rejection of all other terms as by selection of the one chosen. Watt likens this to the two terms Chomsky uses of linguistic behaviour, 'competence' and 'performance'—the first being roughly the 'linguistic' armoury we have at our disposal and the second the uses we make of it. This is, I hasten to add, no more than an analogy, but talking and indexing are both means of communication, and therefore in both situations the generator of the message needs some knowledge of the receiver of the message—and employs some art in constructing the best message.

Another problem seems to me to be evident in the difference between the first draft Intermediate Lexicon and the current work. The first draft was actually used to switch between two documentation centres in France and in Germany, apparently to the satisfaction of those concerned. Yet this first draft was organized at a very generic level containing in fact only twenty-five groups. In other words, switching was effected through a process of establishing what was common to a number of systems and sinking the remaining small differences. In Boolean terms, perhaps, groups were formed by addition. The current project uses an analytical procedure to identify what is the difference between terms; in Boolean terms to examine the intersection between terms of different languages. These different approaches may be compared to the establishment of concordances between grouping keys and between search keys.

A further problem, which has been largely ignored, is the linguistic factor. What are the additional problems associated with switching, e.g. from an analytical language such as English to an isolating language like Chinese? What are the problems to be expected in switching non-scientific concepts between different socio-cultural groups? For example, how do we compare 'information science' as defined in the USA and as in the UK, with 'documentation' as defined in Europe and 'informatics' as defined in the USSR?

Finally, considering the Intermediate Lexicon itself, or the largest thesaurus in the co-operative proposed by Neville, is it not possible that each could become the standard language for the particular group of organizations?

BIBLIOGRAPHY

General & problems

1 ENGINEERS JOINT COUNCIL. *Thesaurus of engineering and scientific terms: a list of scientific and engineering terms and their relationships for use in a vocabulary for indexing and retrieving technical information*. New York: The Council, 1967.
2 VICKERY, B. C. Analysis of information. *In*: *Encyclopaedia of Library and Information Science*, Vol. 1. New York: Dekker, 1968, p. 355–84.
3 KLINGBIEL, PAUL H. *Language oriented retrieval systems*. AD 271 600. ASTIA, 1962.

4 NIGHTINGALE, R. A. Some quantitative aspects of feature card systems: results of a questionnaire. *Aslib Proc.*, 23, 9, September 1971, p. 481–93.

5 ASLIB. *Classification in science information: a comparative study.* Report presented to the International Council of Scientific Unions. London: Aslib, 1969.

6 VICKERY, B. C. *Classification in science information—addendum.* Report presented to the International Council of Scientific Unions. London: Aslib, 1970.

7 REISNER, P. Semantic diversity and a growing man-machine thesaurus. *In*: KOCHEN, M. *Some problems in information science.* New York: Scarecrow Press, 1965.

8 WATT, W. C. Habitability. *JASIS*, 19, 3, July 1968, p. 338–51.

Compatibility

9 HAMMOND, W. Dimensions in compatibility. *In*: NEWMAN, S. M. (ed.) *Information systems compatibility.* Washington: Spartan Books, 1965.

10 ANGELL, R. S. Compatibility in subject access vocabularies: the roles of relations between index terms. *In*: VINITI, *International forum on informatics*, Vol. II, 1969, p. 243–61.

11 HENDERSON, M. M. and others. *Cooperation, convertibility, and compatibility among information systems: a literature review.* Washington: National Bureau of Standards, 1966.

Conversion methods

12 LLOYD, G. A. The UDC in its international aspects. *Aslib Proc.*, 21, 5, May 1969, p. 204–8.

13 AUSTIN, DEREK. Prospects for a new general classification. *J. Librarianship*, 1, no. 3, July 1969, p. 149–69.

14 AUSTIN, DEREK. Development of a new general classification: a progress report. *Inf. Sci.*, 3, 3, November 1969, p. 95–115.

15 WAHLIN, EJNAR. Principles for a universal system of classification based on certain fundamental concepts and an outline of a variant adapted to technology. *J. Doc.*, 19, 4, December 1963, p. 173–86.

16 WAHLIN, EJNAR. The A-R Complex—adapted systems used in combination with a common reference system. Unpublished paper presented to the 1st Ottawa Conference on The Conceptual Basis of the Classification of Knowledge. September 1971.

17 ENGINEERS JOINT COUNCIL. *Study of engineering terminology and relationships among engineering terms: final report.* New York: The Council, 1963.

Concordance between notations

18 PERREAULT, J. M. On concordance between classifications. *In*: VINITI, *International forum on informatics*, vol. II, 1969, p. 230–41.

19 HENSHAW, MARIE. Conversion sampler. *Lib. J.*, 92, 1st November 1967, p. 3964–6.

20 MATTHIS, R. E. *and* TAYLOR, D. *Adopting the Library of Congress classification system: a manual of methods and techniques for application or conversion.* New York: Bowker, 1971.

21 RANGANATHAN, S. R. *and* NEELAMEGHAN, A. Basis for study of compatibility, and of compatibility of the Colon Classification with the Universal Decimal Classification. *Lib. Sci.*, 7, 2, June 1970, p. 97–109.

22 LLOYD, G. A. Comparison of the Dewey and Universal Decimal Classifications. *Rev. Doc.*, 27, 2, May 1960, p. 45–80.

23 LLOYD, G. A. Comparison of the Dewey and UDC at a minimum 3-figure level. The Hague: FID, 1960.

24 VICKERY, B. C. Coding for interconvertibility. *In*: KENT, A. K. *Information retrieval and mechanical translation, part* 2, 1961, p. 1159–74.

Concordance between notations and terms

25 STUEART, ROBERT D. An analysis of the Universal Decimal Classification as a term system for nuclear science and technology. *Lib. Resour. & Tech. Serv.*, 15, 3, Summer 1971, p. 399–411.

Concordance between terms

26 HAMMOND, W. *and* ROSENBORG, S. Indexing terms of announcement publications for government, scientific and technical research reports. A composite vocabulary. 2 vols. Maryland: Datatrol Corporation, 1964.

27 HAMMOND, W. *and* ROSENBORG, S. Experimental study of the convertibility between large technical indexing vocabularies. Datatrol Corporation. Technical Report IR-I (NSF C-259) August 1962.

28 COUNCIL FOR SCIENCE AND TECHNOLOGY. *COSATI subject category list.* Washington, D.C.: Office of Science and Technology, 1964.

29 OECD. *Aligned list of descriptors for economic and social development.* 5 vols. Paris, 1969.

30 NEVILLE, H. H. Feasibility study of a scheme for reconciling thesauri covering a common subject. *J. Doc.*, **26**, 4, December 1970, p. 313–36.

31 WALL, E. *and* BARNES, J. *Intersystem compatibility and convertibility of subject vocabularies.* Auerbach Corporation, Technical Report 1582–100–TRS, 1969. Clearing House for Federal Scientific, and Technical Information, Washington, Report No. PB 184144.

Intermediate lexicon

32 GARDIN, NATACHA, *and* LEVY, FRANCIS G. *Documentary Lexicon for scientific information.* Marseilles: Groupe d'Etude sur l'Information Scientifique, 1969. Convention de recherche entre la Delagation Generale a la Recherche Scientifique et Technique et l'Association Marc Bloch, 1967.

33 COATES, E. J. *and* WEEKS, D. C. *An outline intermediate lexicon to assist inter-conversion between terms used in various indexing languages in the field of scientific and technical information processing, compiled by an International Working Party convened by the Groupe d'Etude sur l'Information Scientifique* (Marseilles, Paris). Washington, D.C.: George Washington University, Biological Sciences Communication project. 1968.

34 LEVY, FRANCIS G. Compatibility between classifications and thesauri: first evaluation of a study in the field of information storage and retrieval. *In*: FEDERATION INTERNATIONAL DE DOCUMENTATION. *Conference*, 33rd, Tokyo, September 1967.

35 COATES, E. J. Library science and documentation literature: a new development in international co-operation. *Libr. Ass. Record*, **70**, 7, July 1968.

36 LEVY, FRANCIS G. Towards an exchange project in information science. *In*: VINITI, *International forum on informatics*, vol. 1, 1969, p. 151–68.

37 GARDIN, NATACHA. The Intermediate Lexicon. A new step towards international cooperation in scientific and technical information. *UNESCO Bull. Libr.*, **23**, 2, March/April, 1969, p. 58–63.

38 COATES, E. J. Switching languages for indexing. *J. Doc.*, **26**, 2, June 1970, p. 102–110.

'Metasystem'

39 DEPARTMENT OF THE ENVIRONMENT. *An information system for the construction industry. Final report of the Working Party of Data Coordination.* London: HMSO, 1971.

40 DEPARTMENT OF THE ENVIRONMENT. Directorate General of Development (Housing and Construction). *A classification framework for the construction industry* (to be published).

41 CONSTRUCTION INDUSTRY THESAURUS. Compiled by Michael Roberts *et al.* for the North Western Polytechnic School of Librarianship and the Polytechnic of the South Bank. 2nd Preliminary draft. London, 1971.

42 ENGLISH ELECTRIC COMPANY. *Thesaurofacet: a thesaurus and faceted classification for engineering and related subjects,* compiled by Jean Aitchison *et al.* Whetstone: The Company, 1969.

Some thesauric history

Karen Sparck Jones

University of Cambridge Computer Laboratory

Paper presented at the Annual Conference of the Co-ordinate Indexing Group, Churchill College, Cambridge, 12th–14th April 1972

AN INFORMATION RETRIEVAL thesaurus is a familiar object: it consists of a set of more or less controlled terms functioning as conceptual labels for sets of natural language entry words, with some indication of relations between terms in the form of references from terms to other BT's, NT's or RT's. Such an indexing language differs from a set of natural language keywords in involving vocabulary normalization; from a list of subject headings in being designed for post-co-ordination; and from a classification in having a limited structure.

We are also familiar with an ordinary thesaurus like Roget's. This is related to retrieval thesauri in grouping words, typically synonyms, but also generic or related terms, and antonyms; it differs from retrieval thesauri in that the character of a retrieval thesaurus is determined by its purpose. In retrieval we are primarily interested in the terms rather than the entry words, and we are usually concerned with relatively specialized or restricted entry and indexing vocabularies.

The retrieval thesaurus of the post-co-ordinate kind, distinct from a subject heading list or full classification, is a relatively recent introduction, though its indexing relatives go back to the nineteenth century, subject headings to Cutter in 1876 and classifications to Dewey, also in 1876, while the best known general thesaurus, that of Roget, dates from 1852. But the organization of a vocabulary on a conceptual basis is an old idea, which has appeared in different guises, in different contexts, for different purposes; and modern arguments about the nature and construction of thesauri have their historical analogues. A historical survey of vocabulary classifications may therefore be useful, and is both interesting and fun. The lines between thesauri and classifications are not always clear, and I shall therefore be concerned in general with works exhibiting some grouping of natural languages words under explicit or implicit conceptual labels, with an indication of relations between classes. Grouping is chiefly based on synonymy or resemblance of meaning—not surprisingly since synonymy is a characteristic feature of natural language—and I shall therefore regard the treatment of synonymy as relevant to the history of thesauri. The difference in status for entry words and index terms, which is typical of retrieval thesauri, may not always be apparent; but since index terms are ultimately conventional labels for concepts extensionally defined by sets of natural language words, the absence of the distinction is not very important.

We can distinguish various intertwined strands in the history of thesauri.

The oldest and most persistent form of vocabulary classification is the thesaurus intended as a contribution to language description and aid to language use. The subject classification of vocabularies, grouping related words, goes back to the Sanscrit Amera Cosha, the classical *Onomastikon* of Pollux, and Aelfric's Anglo-Saxon Latin Glossary. In Pollux words, including synonyms, are grouped under ten headings like Gods, Man (parts of the body), Science and Art, Hunting, and Meals. In Aelfric words are arranged under such heads as Agricultural Tools, Occupations, Insects, Clothes, and Drinks.

Synonymy as a particular form of verbal relationship was discussed by classical writers in connection with rhetoric, and the first modern works on synonymy were similar discussions intended as guides to the correct use of language. The first such is Girard's *Justesse de la Langue Françoise* of 1718, while the first original English publication on the same lines is Mrs Piozzi's *British Synonymy* of 1794. Girard's approach is illustrated by his treatment of *étudier* and *aprendre*:

> *Étudier,* c'est uniquement travailler à devenir savant. *Aprendre,* c'est y travailler avec succes. On *étudie* pour *aprendre*; et l'on *aprend* à force d'*étudier*.

A typical article by Mrs Piozzi is as follows:

> . . . A man FORSAKES his mistress, ABANDONS all hope of regaining her lost esteem, RELINQUISHES his pretensions in favour of another; GIVES UP a place of trust he held under the Government, DESERTS his party, LEAVES his parents in affliction, and QUITS the kingdom for ever.

Her work was followed by collections by Taylor in 1813, Graham in 1846, and Miss E. Whateley in 1851, all based on the same principle, though differing in detail.

The characteristic feature of these collections is their relatively limited vocabulary. We also get more comprehensive dictionaries based on lexical relations, especially synonymy. We think of a dictionary entry for a word as being intended to offer a definition of it, in a more or less Aristotelian sense; but we frequently encounter definition by synonymy in ordinary dictionaries. In the *OED*, for instance, we get:

> *Shame*: Disgrace, ignominy, loss of esteem or reputation.

This kind of entry occurs in an early dictionary like Johnson's, and in 1805 Perry pushed the idea further in his *Synonymous, Etymological, and Pronouncing English Dictionary*. This is an adaptation of Johnson's *Dictionary*, but with entries consisting only of synonyms, and with cross references to others. For example, Johnson gives:

> FLUTTER
> 1. Vibration; undulation; quick and irregular motion.
> 2. Hurry; tumult; disorder of mind.
> 3. Confusion; irregular position.

while in Perry we find

> FLUTTER
> Vibration, undulation, quick and irregular motion;
> hurry, TUMULT, disorder of mind;
> DISORDER, confusion, derangement, irregular position.

This form of dictionary emphasizing verbal relations constitutes a second thread in thesaurus history. Perry's *Dictionary* has been followed by many others. In his *English Synonymes Explained in Alphabetical Order*, of 1816, Crabb combined the ideas of dictionary and discussion, in his 1826 edition adopting a conceptual rather than alphabetical ordering. For example, we get a sequence of entries as follows:

TO KNOW, BE ACQUAINTED WITH
KNOWLEDGE, SCIENCE, LEARNING, ERUDITION
. . . .
SCHOOL, ACADEMY
EDUCATION, INSTRUCTION, BREEDING
IGNORANT, ILLITERATE, UNLEARNED, UNLETTERED
. . . .
CULTIVATION, CULTURE, CIVILIZATION, REFINEMENT

Crabb's work can be regarded as the predecessor of Roget's *Thesaurus*, though Roget did not think of his work as a dictionary, but rather as a literary aid. Roget thought of his *Thesaurus* as a classification of ideas, which could assist those looking for appropriate words; and he regarded the organization of the one thousand sections, or heads, expressed in the Tabular Synopsis of Categories as an important component of the whole. One could in principle find one's way to the formulation of an initially fuzzy idea by following the appropriate path down the tree, to a particular section where one would look for the specific word most appropriately expressing the idea. Thus in his 'Introduction' Roget says:

> [This work is] a collection of words . . . arranged, not in alphabetical order, as they are in a Dictionary, but according to the *ideas* which they express. The purpose of an ordinary dictionary is simply to explain the meaning of words; and the problem of which it professes to furnish the solution may be stated thus:—The word being given, to find its signification, or the idea it is intended to convey. The object aimed at in the present undertaking is exactly the converse of this; namely,—The idea being given, to find the word, or words, by which that idea may be most fitly and aptly expressed. For this purpose, the words and phrases of the language are here classed, not according to their sound or their orthography, but strictly according to their *signification*.

He also says that:

> In constructing the . . . classification of the ideas which are expressible by language, my chief aim has been to obtain the greatest amount of practical utility. I have accordingly adopted such principles of arrangement as appeared to me to be the simplest and most natural.

Clearly, Roget did not concentrate primarily on the relations between the words in the vocabulary, as given by their grouping in sections or through section cross-references, but on the way they express different aspects of the general concept tagged with the section label. The two points of view are nevertheless complementary, since the concept represented by the head name is defined by the set of synonymous or similar words grouped under it; and in fact Roget's *Thesaurus* was widely regarded as a synonym collection, and it is the progenitor of a whole range of thesauri and synonym dictionaries on various plans, topical or alphabetical, exhibiting varying degrees of grouping and relational structure, sparse or rich, a variety of interpretations of synonymy and resemblance, from the narrow to the broad, and of treatments, covering simple listing and full discussion, and so on. An early example is Smith's *Complete Collection of Synonyms and Antonyms* of 1867, which is of interest first because Smith explicitly refers to Roget's work as a synonym collection, and indeed condemns Roget for his tiresome conceptual organization; and secondly, because Smith systematically incorporated antonyms in his entries, and in fact coined the word. Soule's 1871 *Dictionary of English Synonymes and Synonymous or Parallel Expressions* is another such work. By now there are many publications called Roget's *Thesaurus*, including the 1962 revision of the original and a mass of more or less plagiaristic copies, translations and adaptations. There are other more independent thesauri, and many synonym dictionaries, including the well-known *Webster's Dictionary of Synonyms.*

Though Roget's main objective was to provide a literary aid, he also refers to another strand in thesaurus history. As he notes in his 'Introduction':

> Metaphysicians engaged in the . . . investigation of the Philosophy of Language will be materially assisted by having the ground thus prepared for them, in a previous analysis and classification of our ideas; . . . It is by such analysis alone that we can arrive at a clear perception of the relation which [words] bear to their corresponding ideas, or can obtain a correct knowledge of the elements which enter into the formation of compound ideas, and of the exclusions by which we arrive at the abstractions so perpetually resorted to in the process of reasoning, and in the communication of our thoughts.
>
> Lastly, such analyses alone can determine the principles on which a strictly *Philosophical Language* might be constructed.

Activities such as his, in other words, are the necessary preliminary to the construction of a universal language, or Real Character. Roget was connected with the Royal Society, and refers to Wilkins's *Essay towards a Real Character and a Philosophical Language,* which was published in 1668. Wilkins's book was sponsored by the Royal Society, and as a major attempt to produce a Universal Character, was the outcome of the general seventeenth-century interest in a universal language, both in England and Europe as a whole. This idea of a Universal Character, early advocated by Bacon, attracted many scientists and philosophers, including such major figures as Descartes, Newton and Leibniz, the last especially. Indeed the project of a universal scientific language on philosophical principles is one of the most distinctive features of seventeenth-century scientific thought.

The objectives of the Universal Character were:

(1) that it should be an international language;
(2) that it should be a convenient means of scientific description; and
(3) that it should be a vehicle for scientific argument.

Scientists wanted a new language to replace Latin, which was now felt to be inadequate and out of date; and their interest in having an interlingua was heightened by their growing awareness, for example through exploration, of the large number of vernacular languages. For instance Wilkins says:

> . . . if men should generally consent upon the same way or manner of *Expression,* as they do in the same *Notion,* we should then be freed from that Curse in the Confusion of Tongues, with all the unhappy consequences of it.

Again, Boyle in 1647 optimistically argues that:

> . . . since our arithmetical characters are understood by all the nations of *Europe* the same way, though every several people express that comprehension with its own particular language, I conceive no impossibility, that opposes the doing that in words, that we see already done in numbers.

Secondly, these thinkers were concerned that the language used to describe their increasing range of scientific investigations should be clear and accurate. There was a widespread feeling that productive thinking is confused by the ambiguous or vague words that occur all too frequently in natural languages, and that a concentration on words rather than things was typical of frowsty mediaeval thinking. Thus Sir William Petty claimed that 'whereas all writings ought to be descriptions of things, they are now only of words, notions, opinions, theories', and he wanted to construct a 'Dictionary of Sensible Words' showing 'what sensible Matter, Thing, Motion or Action, every word therein doth mean and signify.' He himself gives a list of one hundred 'sensible' words including 'God', 'King', 'World', 'City', 'Liberty', 'Truth', 'Rich', 'Chance' and 'Ridiculous'.

Thirdly, there was a general desire for sound and explicit argument in philosophical writing. It was felt that scientific discourse should be able to handle a broad range of modes of description and argument effectively, and that it was essential that there should be a language suited to such purposes to hand. This point is made by Sir Thomas Urquhart, for example, in his *Introduction to the Universal Language*, published in 1652. Referring to his design for a Universal Character (unfortunately lost at the battle of Worcester), he claims that 'for the affirmation, negation and infinitation of propositions, [my language] hath properties unknown to any other language', and that 'in matters of Enthymems, Syllogisms, and all manner of illative ratiocination, it is the most compendious in the world'.

A Universal Character would thus be distinguished by unambiguous, transparent, and hence effective, signs. This in turn leads to the idea of a set of basic conceptual or semantic primitives, which can be used in combination for more complex concepts. There would be simple signs for the fundamental notions, and more complicated, secondary notions would be represented by the appropriate combinations of the signs for the primitives. This concept-building activity could in principle be extended beyond items corresponding to ordinary language words, up to phrases and sentences, though it is not clear how far these writers went into the problems of generating complex grammatical structures. The brief remarks made by Wilkins, for example, suggest that he thought of discourse as a sequence of elementary propositions with the word signs following a natural logical order; this has its limitations, and he independently produces a word for word translation of the Lord's Prayer into his Character. The notion of a list of primitives constituting a set of 'clear and simple ideas' was put forward by Descartes in 1629, and it is found in other writers like Ward, who, writing in 1654, says:

> My first proposal was to find whether other things might not as well be designed by Symbols (as in Mathematics), and herein I was presently resolved that Symbols might be found for every *thing* and *notion*. . . . So that an Universal Character might easily be made wherein all

> Nations might communicate together, just as they do in numbers and in species. ... And the thing proposed is feasible, but the number of several Characters will be almost infinite ... and the learning of them either impossible or very difficult ... But it did presently occur to me, that by the help of Logic and Mathematics this might soon receive a mighty advantage, for all Discourses being resolved into sentences, those into words, words signifying either simple notions or being resolvable into simple notions, it is manifest, that if all the sorts of simple notions be found out, and have Symbols assigned to them, those will be extremely few in respect of the other, ... the reason of their composition easily known, and the most compounded ones at once will be comprehended, and yet will represent to the very eye all the elements of their composition, and so deliver the natures of things.

Further thinking along these lines was supported by work on suitable notations, like that put forward by Lodwick in *A Common Writing* in 1647.

The first really substantial scheme, in which a universal language was worked out in some detail, was Dalgarno's of 1661. In his *Ars Signorum* Dalgarno has an Alphabet of concepts, starting with twenty basic notions, with two levels of subdivision under them, the notions being represented by letters or letter strings of a syllabic character. Thus the main classes include: A, *Ens*; O, *Corpus*; B, *Accidens Mathematicum*; K, *Accidens Politicum*; and F, *Concretum Artefactum*. Under G, *Qualitas Sensibilis*, for example, we find GAs which stands for *Tactus* and GOs for *Color*, while at the third level under *Tactus*, say, we find single items or paired opposites like:

gan humiditas	r.	siccitas
gaf densitas	r.	raritas
gat asperitas	r.	laevitas
gak fluiditas	r.	consistentia.

Dalgarno further shows how his alphabet is used by providing a Lexicon Latino-Philosophicum giving codes in his language for 1500 Latin words. Thus we get *evangelium* represented by 'tibsηb', where 'tib' stands for *Docere* and 'sηb' for *Salus*, and *industria* by 'pippumspηp', where 'pip' is *Diligentia*, 'pum' is *Curare* and 'spηp' is *Laborari*.

Wilkins's *Essay* of 1668 is described by Hartley as the outcome of 'an enormous sustained effort of logical thinking'. In particular, Wilkins attempted to consider all the aspects of a Universal Character though, as noted, he did not go very far into discourse formation in it, and he worked out his ideas in tremendous detail. Thus he says that a universal language must be concerned 'with the *nature of things*, and that common Notion of them, wherein Mankind does agree', and that for this a 'just *Enumeration* and description of such things as are to have *Marks* or *Names* assigned to them' is required. Part II of the *Essay* is a massive hierarchical classification of ideas, characterized in an Aristotelian manner, with English words, including sets of synonyms or near synonyms, at the lowest level. The comprehensive, and complex, nature of the whole is illustrated in Figure 1.

This huge system is supported by a notation designed according to the 'transparency principle' already mentioned, and a dictionary of English words is supplied leading to the points in the classification where the corresponding universal language concept labels are to be found. This is exactly like a retrieval thesaurus with natural language entry words leading to concept labels, which happen to be in the same language.

Unfortunately, Wilkins's scheme was never taken up as it was both too complicated and, in the last resort, too arbitrary. The systematic application of the Aristotelian principle, in particular, is very artificial at some points. Some individuals played with it: Hooke, for example, gives 'a short communication

FIG. 1: Wilkins's classification of ideas from his *Essay towards a real Character and a Philosophical Language*

- *General*; namely those Universal notions, whether belonging more properly to
  - *Things*; called TRANSCENDENTAL
    - GENERAL
    - RELATION MIXED
    - RELATION OF ACTION
  - *Words*; DISCOURSE
- *Special*; denoting either
  - CREATOR
  - *Creature*; namely such things as were either *created* or *concreated* by God, not excluding several of those notions, which are framed by the minds of men, considered either
    - *Collectively*; WORLD
    - *Distributively*; according to the several kinds of beings, whether such as do belong to
      - *Substance*;
        - *Inanimate*; ELEMENT
        - *Animate*; considered according to their several
          - *Species*; whether
            - *Vegetative*
              - *Imperfect*; as *Minerals*;
                - STONE
                - METAL
              - *Perfect*; as *Plant*;
                - HERB considered according to the
                  - LEAF
                  - FLOWER
                  - SEED-VESSEL
                - SHRUB
                - TREE
            - *Sensitive*;
              - EXANGUIOUS
              - Sanguineous;
                - FISH
                - BIRD
                - BEAST
          - *Parts*;
            - PECULIAR
            - GENERAL
      - *Accident*;
        - *Quantity*;
          - MAGNITUDE
          - SPACE
          - MEASURE
        - *Quality*; whether
          - NATURAL POWER
          - HABIT
          - MANNERS
          - SENSIBLE QUALITY
          - SICKNESS
        - *Action*;
          - SPIRITUAL
          - CORPOREAL
          - MOTION
          - OPERATION
        - *Relation*; whether more
          - *Private*;
            - OECUMENICAL
            - POSSESSIONS
            - PROVISIONS
          - *Public*;
            - CIVIL
            - JUDICIAL
            - MILITARY
            - NAVAL
            - ECCLESIASTICAL

FIG. 1 (cont.)

SPIRITUAL ACTION is immediately sub-divided as follows:

The Genus of SPIRITUAL ACTIONS, may be distributed into such as do belong either to

- GOD
- *The Soul*, with reference to the
  - *Understanding*
    - SPECULATIVE
    - PRACTICAL
  - WILL
  - *Fancy* or *Appetite*; the Actions of which are to be styled *Affections* or *Passions*, and may be distinguished into such as are either more
    - SIMPLE
    - MIXED

One of these sub-divisions, *Understanding*, is itself structured thus:

ACTIONS of the UNDERSTANDING and Judgement SPECULATIVE, *Contemplation*, *Theory*, are such as do *concern* the various *exercise of our understandings* about the *Truth* and *Flasehood* of things, with respect either to

- *Understanding*; being either
  - *Preparative*; in the first *Objectisation* of a thing: or the *reflexive* thought about it, together with what else one knows of that kind.
    - 1. THINKING, Cogitation, bethink, deem, imagine, esteem, Conceit, Notion, Thought-ful, pensive, mind it, suggest, put in one's head,
      MEDITATING, Study, considering, cast about in one's mind, muse, contemplate, Elucubration, think, fore-think, premeditate, ponder extempore.
  - *Operative*; in the comparing of things *to find out* what is *Truth*: or the *Thought resulting* from such comparison.
    - 2. INQUISITION, Examination, Search, Scrutiny, exploration, investigate, Disquisition, seek, discuss, hunt, canvass, cast water, Quest, Inquest.
      DISCOVERY, detect, find, perceive, sift out, pick out, Invention, excogitate, Author, Inventor, tell, inkling, 'tis out.
- *Judgement*;

. . . .

of the general ground of my Invention for *Pocket-Watches*' in the Character, and he indeed enthusiastically maintains of Wilkins's system that it is

> a Character and Language so truly Philosophical, and so perfectly and thoroughly Methodical, that there seemeth to be nothing wanting to make it have the utmost perfection, and highest Idea of any Character or Language imaginable, as well for Philosophical as for common and constant use.

We may also note that Pepys says in his Diary that he 'made the boy to read to me out of Dr. Wilkins his 'Real Character', and particularly about Noah's arke, where he do give a very good account thereof, . . . which do please me mightily.' But one is left with the feeling that Wilkins's associates were secretly somewhat embarrassed to find that this system, into which so much effort had been put, and which seemed to be so admirable in principle, did not seem to be so necessary as to justify the enormous effort required to learn it.

The other major figure in this seventeenth century study of the Universal Character was Leibniz. What he actually implemented was much less full or coherent than Wilkins's scheme, but he displayed much more sophisticated thinking; in particular, he really grasped the idea of the Universal Character as a calculus, that is as a device for facilitating rigorous scientific thinking.

Leibniz worked on the Character intermittently over a long period. In his early *De Arte Combinatoria* of 1666 he puts forward the notion of extending traditional logic, and of improving the means of argument, in terms of the analysis and synthesis of concepts into and from a set of primitives forming the Alphabet of Human Thought. As Couturat says, Leibniz thought that

> toutes les vérités peuvent se déduire d'un petit nombre de vérités simples par l'analyse des notions qui y entrent, et qu'à leur tour toutes les idées peuvent se réduire par décomposition à un petit nombre d'idées primitives et indéfinissables. Dès lors, il suffirait de faire le dénombrement complet de ces idées simples, véritables éléments de toute pensée, et de les combiner ensemble pour obtenir progressivement toutes les idées complexes par un procédé infaillible.

Later, Leibniz recognized that such a language could be a universal one.

His most important step, however, was in moving from the view of a Character as a representative device to that of it as a manipulative device, the foundation for the Calculus Ratiocinator which would allow scientific inference to take the form of purely mechanical operations on signs: the results would be valid because the relations between signs mirrored the real relations between the things they represented. Leibniz's attitude is also apparent in his studies of a suitable notation, where he favoured numbers since they are suited to a variety of formal operations: in one example he gives 6 as the code for 'Man', since $6 = 2 \times 3$, and 2 stands for 'Animal' and 3 for 'Rational'.

Leibniz's subsequent work was concerned on the one hand with the form of the calculus, and on the other with the knowledge to be represented in the language. The first is associated with the development of modern symbolic logic, and is outside our scope here. The second led to many studies of the form and content of a universal encyclopedia, which are represented by a variety of heading lists, discussions of the mode in which information is to be presented, and sets of examples. Leibniz was particularly concerned that the material should be rationally organized, on the best scientific principles, since the encyclopedia was intended both to sum up existing knowledge and guide future investigation, as effectively as possible. Among the lists of headings, for example, there is one of 1679 which includes *Grammatica*, *Geometria*, *Mechanica*, *Cosmographica*, *Moralis* and *Geopolitica*, while in another table of 1702–4 there is an initial division into RES and ACCIDENTIA, the former covering such headings as *Concreta Mathematica*, and the latter a longer list, as follows:

Accidens Commune
Accidentia Mathematica
Accidens Physicum
Qualitas Sensibilis
Accidentia Sensitiva
Accidens Rationale
Accidens Oeconomicum
Accidens Politicum.

Under these headings are definitions of concepts and objects, for example:

Aer est fluidum impalpabile Elasticum
Pictura est similitudo rerum solidarum in superficie
Alteratio est mutatio qualitatis
Tuba instrumentum musicum ore inflatile majus incurvum ex metallo.

In every case, however, Leibniz's schemes, while well-intentioned, were fragmentary in execution, though this is not surprising given their very ambitious design.

Neither Wilkins nor Leibniz, respectively the most determined and the most advanced thinkers about a Universal Character, succeeded in producing a convincing one. Since, there has been no real attempt to satisfy all of the objectives of the Character. It was intended to be at once an international language, scientific symbolism and calculating medium, but since the seventeenth century attempts have either been made only to satisfy one or perhaps two of these requirements fully, or all of them partially. These represent other strands in thesaurus history. Thus as Firth points out, the interest in an international means of communication for scientists led on the one hand to the development of standard scientific terminologies, managed by committees, and on the other to interlinguas like Esperanto. The terminologies are international, but are linguistic auxiliaries and in no sense languages; the interlinguas are proper languages, but are scientifically inadequate. It is worth noting that none of the modern interlinguas is wholly *a priori*: some, like Basic English, are simplified versions of one language, while others, like Esperanto, are derived from several languages. Volapük has some *a priori* elements. The second requirement is met by the notational systems used in chemistry, for example, though this refers to a limited universe of discourse. Symbolic logic in its modern development comes nearest to the third. Very specialized languages like those of mathematics perhaps satisfy all three requirements, but only in a somewhat limited sense.

In addition, some trends associated with the Universal Character have continued independently, as indeed they began. One is scientific classification. John Ray assisted Wilkins with the biological sections of his classification, and in the eighteenth and nineteenth centuries the sorting and naming of plants and animals was a major scientific activity. The eighteenth century saw the appearance of many encyclopedias, including the great French *Encyclopédie*, published between 1751 and 1765, and the *Encyclopedia Britannica*, of 1768–71. Language normalization is represented by such enterprises as the Dictionary of the Académie Française, on which work began in 1639. The general interest in the operation of language appears in such works (to cite random examples) as Wallis's *Grammatica Linguae Anglicanae* of 1653, Arnauld and Lancelot's *Grammaire Générale et Raisonnée* of 1660 and Harris's *Hermes* of 1751.

What, now, can we learn from this variegated history relevant to information retrieval?

Librarians have a practical aim. Dewey in effect said: organize your books so that you can find them, and never mind the philosophy. His opponents are those who say that you will never succeed in finding them unless you get the philosophy right first. My gloss on Dewey is: organize your books so you can find them, and the philosophy will look after itself. Dewey of course referred to a full-blown library classification, but the point holds for more modest indexing languages. A historical survey like the one I have attempted shows what a variety of approaches to conceptual vocabulary organization there are, and a look at any set of ordinary English thesauri will show how differently the same vocabulary can be treated, even when these categorizations are nominally based on the same principle. Retrieval thesauri are concerned with restricted vocabularies, but we have no reason to suppose that a restricted vocabulary is used in a manner which differs essentially from that of our ordinary vocabulary. This being the case, we should be careful not to adopt too doctrinaire an approach to constructing a retrieval thesaurus. We should not try to catch words and pin them down in neat little conceptual pigeonholes: such index terms will then be no more use for fertilizing library users' thoughts than dead butterflies are for fertilizing flowers.

BIBLIOGRAPHY

For a fuller account of this area, with further references, see K. Sparck Jones, *Synonymy and Semantic Classification*, Ph.D. Thesis, University of Cambridge, 1964 (filed under K. S. Needham), Appendix 1.

AELFRIC, *Glossary*. *In*: Somner, W. *Dictionarium Saxonico-Latino-Anglicum*. Oxford, 1659.

AMERA SINHA, *Cosha, or Dictionary of the Sanscrit Language*. (Ed. Colebrooke). Serampoor, 1808.

ARNAULD, A. *and* LANCELOT, C. *Grammaire Générale et Raisonnée, contenant les fondements de l'art de parler et des remarques sur la langue françoise*. Paris, 1660.

BACON, F. *The Advancement of Learning*, 1605. *In*: *Works* (Ed. Spedding, Ellis and Heath). London, 1857–74.

BOYLE, R. Letter to Hartlib, 19th March 1647. *In*: *Works* (Ed. Birch). London, 1744.

COUTURAT, L. *La Logique de Leibniz*. Paris, 1901.

CRABB, G. *English Synonymes Explained in Alphabetical Order*. London, 1816; Revised edition entitled *English Synonymes*, London, 1826.

CUTTER, C. A. *Rules for a Dictionary Catalog*. Washington, 1876.

DALGARNO, G. *Ars Signorum, vulgo Character Universalis et Lingua Philosophica*. London, 1661; Reprinted Edinburgh, 1834.

DESCARTES, R. Letter to Mersenne, 20th November 1629. *In*: *Oeuvres* (Ed. Adam and Tannery). Paris, 1897.

DEWEY, M. *Decimal Classification and Relative Index*. Lake Placid, New York, 1876.

Encyclopedia Britannica. Edinburgh, 1768–71.

Encyclopédie. Paris, 1751–65.

FIRTH, J. R. *The Tongues of Men*. London, 1937.

GIRARD, G. *La Justesse de la Language Françoise, ou les différentes significations des mots qui passent pour être synonymes*. Paris, 1718; Revised edition entitled *Synonymes François*, Paris, 1769.

GRAHAM, G. F. *English Synonymes Classified and Explained*. London, 1846.

HARRIS, J. *Hermes*: *or, A Philosophical Enquiry concerning Universal Grammar*. London, 1751.

HARTLEY, H. (Ed.) *The Royal Society—its Origins and Founders*. London, 1960.

HOOKE, R. *A Description of Helioscopes and Some Other Instruments, 1676*. *In*: *Early Science in Oxford* (Ed. Gunther), Oxford, 1920–67.

JOHNSON, S. *A Dictionary of the English Language*. London, 1755.

LEIBNIZ, G. W. *Consilium de Encylopedia nova conscribenda methodo inventoria, 1679*. *In*: *Opuscules et Fragments Inédits de Leibniz* (Ed. Couturat). Paris, 1903.

——*De Arte Combinatoria, 1666*. *In*: *Die Philosophischen Schriften von G. W. Leibniz* (Ed. Gerhardt). Berlin, 1875–90.

——Table dated 1702–4. *In*: *Opuscules* . . . (Ed. Couturat). Paris, 1903, p. 437.

LODWICK, T. *A Common Writing, whereby two, though not understanding one the other's language, yet by the help thereof, may communicate their minds one to another*. London, 1647.

PEPYS, S. Diary entry for 27th May 1668. *In*: *The Diary of Samuel Pepys* (Ed. Wheatley), London, 1893–9.

PERRY, W. *Synonymous, Etymological, and Pronouncing English Dictionary*. London, 1805.

PETTY, W. *The Dictionary of Sensible Words*, 1685, and *Exercises of Sense and Reason*. *In*: *The Petty Papers* (Ed. Marquis of Lansdowne). London, 1927.

PIOZZI, H. L. *British Synonymy*; *An Attempt at Regulating the Choice of Words in Familiar Conversation*. London, 1794.

POLLUX, JULIUS. *Onomasticon* (Ed. Bekker). Berlin, 1846.

ROGET, P. M. *A Thesaurus of English Words and Phrases, Classified and Arranged so as to facilitate the Expression of Ideas and assist in Literary Composition.* London, 1852. Revised edition entitled *Roget's Thesaurus of English Words and Phrases* (Ed. Dutch). London, 1962.
SMITH, C. J. *A Complete Collection of Synonyms and Antonyms.* London, 1867.
SOULE, R. *A Dictionary of English Synonymes and Synonymous or Parallel Expressions.* London, 1871.
TAYLOR, W. *English Synonyms Discriminated.* London, 1813.
URQUHART, T. *An Introduction to the Universal Language. In: Ekskybalauron.* London, 1652; Reprinted Edinburgh, 1834.
WALLIS, J. *Grammatica Linguae Anglicanae.* London, 1653.
WARD, S. *Vindiciae Academiarum.* Oxford, 1654.
Webster's Dictionary of Synonyms. Springfield (Mass.), 1942.
WHATELEY, E. (sometimes attributed to Whateley, R.) *A Selection of English Synonyms.* London, 1851.
WILKINS, J. *An Essay towards a Real Character and a Philosophical Language.* London, 1668.

Some recent approaches to the study of meaning[1]

K. M. Petyt

Department of Linguistics, University of Reading

Paper presented at the Annual Conference of the Co-ordinate Indexing Group, Churchill College, Cambridge, 12–14th April 1972

OF COURSE, an interest in meaning goes back much further in time than the period of modern linguistics. Some of the earliest recorded speculation about language concerned meaning: for instance, the 'nature' or 'convention' dispute among the Greeks[2]—was there, they asked, something which made the word 'cow' the natural one to apply to that animal over there, or was it simply a matter of convention? And there has long been an interest in meaning among students of literature, philosophy, psychology, anthropology, and so on—as is only to be expected, since the main function of language is to convey some sort of meaning, whether we define this in a narrow way, or in a broader one, including connotation, emotion, and so on.

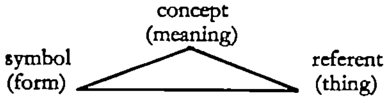
However, linguistics only started to consider the problems of describing meaning in the twenties and thirties, and the linguists in America (the main centre of linguistics) were soon to abandon the subject for twenty years—partly because of dissatisfaction with the traditional approaches and the feeling that the alternatives proposed by linguists were not satisfactory either, and partly because they felt they had enough to do within language itself (in the areas of phonology, morphology, and syntax) without getting involved with meaning, which is where language comes into contact with the messy area of the world outside it!

Only in the last few years has 'semantics' come back to hold a major place in the attention of linguists. We shall briefly consider later two approaches—one from America, and one from Britain (though with its roots on the continent).

But first let us look briefly at the traditional approach to meaning. From early times, a word has been thought to have two aspects, or two sides to its nature—its *form* and its *meaning* (the traditional terms were *vox* and *significatio*; another pair are 'expression' and 'content'). We might almost think in terms of a body and a soul accompanying it. This view is still held by many, and we shall have cause to refer to it again later.

As for the meaning side, the earliest view was that the meaning of a word was the thing it referred to: for example the meaning of 'cow' is 'that animal over there'. But before long, and partly because some words had no 'thing' to which one could point—for example, abstract words like 'beauty', 'love', 'intelligence' and so on—it was held rather that the meaning of a word is the *concept* in the mind of the thing referred to.

In recent times the relationship has been represented graphically as a triangle:[3]



Thus, in the traditional view, a 'form' symbolizes a 'concept', which refers to a thing, event or feature.

There is one obvious point of weakness here: the existence of 'concepts' in the 'mind' is basic to this approach—it is a 'mentalist' theory. Now some philosophers and psychologists have been dubious, to say the least, about the existence of concepts, and even of the mind, and modern linguistics, especially in the thirties and forties, when it was striving to establish itself as a rigorous scientific discipline, found such a mentalist approach abhorrent, for at least these two related reasons:

(i) It is not scientific. It is not empirical: we cannot observe the concepts talked of here—they are not accessible to scientific investigation, and an empirical science cannot rely on evidence which is purely subjective and based on introspection.

(ii) It is circular. The only way that we can tell that there is a concept is by seeing that there is a word: for example, because there is a word 'love', there must be something it symbolizes. Yet we set up concepts to explain the meaning of words, but we can only see the concepts by looking at the words—which is going round in circles.

In reaction to such a mentalist approach, American linguists tried to put forward others that seemed more scientific. One, proposed by Leonard Bloomfield, was in 'behaviourist' terms: language, like all human behaviour, was considered as a matter of Stimulus and Response—so the meaning of a linguistic form was held to be the situation in which it was uttered and the response it called forth. These, it was hoped, could be rigorously described by science.[4] Few people, not even Bloomfield himself, were or are convinced that this is satisfactory (for obvious reasons, and others we cannot go into here), though even today a more complex (though more readily critized) version of this view is held by some people.[5] Another theory was that the meaning of a word was the total of the linguistic contexts it appeared in: for example, while both 'cat' and 'dog' can appear in the company of 'sleep', 'eat', 'mate', 'scratch' etc., they differ in that only 'cat' will appear in the context of 'purr', only 'dog' in the context of 'bark' and so on.[6] But this theory too, though it may be scientific, was not accepted by many.

Let us turn now to some more fruitful approaches of recent years. Above we saw a theory which held that the meaning of a word is what it signifies; it tried to handle meaning in terms of just one type of relation—broadly, that of *reference*: the relation between words and what they 'refer' to. But in the use of language for the purposes of communication it is clear that other relations are important too: for example, the relations of a word to other words in the vocabulary, like those of synonymy or antonymy. These are sometimes called the relations of *sense*. They too are part of the meaning of a word, and here we move into the area we might call *structural semantics*.

But first a very brief word about 'structural linguistics' in general. This is usually held to have begun with the Swiss scholar Ferdinand de Saussure. He claimed that language is essentially a matter of relations—elements of language draw their 'value' not from their actual substance, but from their relations to and difference from other elements. To take a very simple example from de Saussure himself: the English word 'sheep' and the French word usually thought to correspond to it, *mouton*, do not in fact have the same 'value'—'sheep' contrasts with, and has its value limited by the existence of, the word 'mutton', whereas *mouton* does not.

In semantics this notion of 'structure' means that we do not approach meaning solely with the idea that 'word x refers to thing x', but also that 'word x in relation to word y and word z has such and such a value'. We shall look at two approaches that are structural in this sense.

First, *Componential Analysis*. Consider first a simple and oft-repeated example:

	a	*b*	*c*
1.	man	woman	child
2.	bull	cow	calf
3.	ram	ewe	lamb

We can set these words in various proportions to each other, and thus factor out 'components' of their meaning.

For example:

line 1: line 2: line 3—human: bovine: ovine
column a: column b—male: female
columns a and b: column c—adult: infant

Thus we could conclude that the meaning of say 'bull' is a combination of the *semantic components* 'bovine'/'adult'/'male', 'lamb' is 'ovine'/'infant', and so on.

Of course there is nothing really new in this—it has quite a history in logic say, as well as linguistic studies, and some trace can be seen in most dictionaries and thesauri. But in recent years the approach has been made more explicit, beginning not in fact with linguists, but with a number of American anthropologists in the fifties who found it particularly useful in the analysis of kinship terminology in various languages.

From English kinship terms, such as

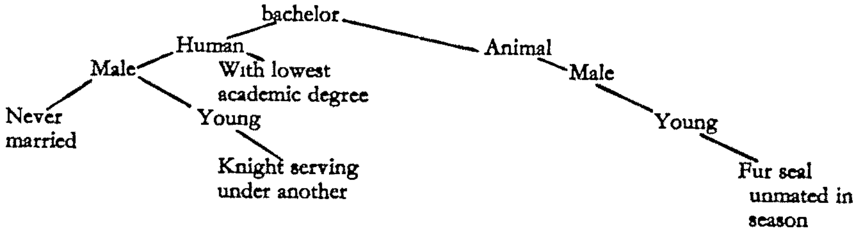
father mother brother sister son daughter
uncle aunt cousin nephew niece

we could obviously extract components such as 'male'/'female', 'parent's generation'/'own'/'children's', 'conjugal'/'sibling', 'same direct family' and so forth. And as we brought in more terms we would have to extract more components, such as 'consanguineal' (blood relation), 'affinal' (in-law) etc.

Other languages may well require us to extract different components. For instance, Hungarian has separate words for 'older brother' and 'younger brother'—so we would need components such as 'older than self' and 'younger than self'. Latin has different terms for 'uncle' and 'aunt', depending on whether they are on the father's side (*patruus, amita*) or the mother's (*avunclus, matertera*); here we could use the components 'agnate' (through males) and 'uterine' (through females). The languages of more primitive communities are often extremely rich in kinship terms, and a large number of meaning components will be needed in order to analyse them.

There have unfortunately not been many attempts to extend this type of analysis to the vocabulary of a language in general. One notable one was by E. H. Bendix, who examined some of the terms in English, Japanese, and Hindi which related to notions of 'possession'.[8] Considering words like 'have', 'get', 'find', 'lend', 'keep' and so on, he extracted components such as 'state', 'change', 'activity', 'chance', 'negation'; for instance, in the expression 'A loses B' there are, loosely speaking, the elements that A has B before the action, he does not have it after it, and there is chance or accident in the action—this can be expressed in terms of the components Bendix extracted.

Though the fact does not seem to be specifically acknowledged, Componential Analysis is also the basis of the approach to semantics of some members of the linguistic school of Noam Chomsky, for example J. J. Katz.[9] In a famous, or perhaps notorious example, 'bachelor' and its components are diagrammed somewhat as follows:


bachelor
Human
Male
With lowest academic degree
Never married
Young
Knight serving under another
Animal
Male
Young
Fur seal unmated in season

Bendix hoped to find general semantic components, and Katz went so far as to claim that there is a *finite* set of components that are *universal*, independent of the structure of any particular language; it is just the combinations of these components to form words that are sometimes unique to a particular language. Katz even said that these components reflect concepts which are part of the cognitive structure of the human mind.

Yet such claims must be treated with extreme caution; they are usually made on the basis of a few well-chosen examples from just a handful of languages and with the benefit of the analyst's introspection—linguists who have had to tackle languages of widely-different cultures are far less likely to make such claims.

However, componential analysis has raised interesting lines of research, particularly into the way the components and bundles of them can be linked to give the meaning of a whole sentence—something given little attention before: semantics has been mainly concerned with the meanings of individual words.

The other theory we shall examine is that put forward by John Lyons.[10] Lyons's work, though it draws on other approaches (particularly those of certain logicians and of the British linguist J. R. Firth) has its main roots in what is known as *semantic field* theory: the idea that the meaning of words is determined by the presence in the vocabulary of other words relating to the same area of culture. For instance, the various colour-terms in a language are mutually defining. The most famous work is that by a German, Jost Trier, who demonstrated the relations among words relating to the 'field' of intellectual knowledge.[11] Lyons developed his theory while studying a similar field in the language of Plato.

There are three main points to the theory:

(i) in meaning at least two types of relation are important: 'reference' and 'sense'.
(ii) it is the sense-relations that give a word its meaning, not vice versa.
(iii) meaning is always bound to a particular context.

We shall now look at these in more detail, though there is only time to consider the third point in passing.

Reference and Sense[12]

'Reference' is the relation that holds between certain items in the vocabulary and certain observable objects, events, or qualities in the outside world: for instance, the words 'cat', 'ball', 'run', 'red' have reference. But not all items in the vocabulary need have reference; for some we may not be able to find any observable referent in the outside world—a word such a 'bravery' for example. Traditional semantics had gone wrong in trying to reduce all meaning to reference: every word must have some reference, it was felt, so a concept had to be what it referred to if nothing else could be observed. But there is no need to believe that all meaning must be a matter of just one type of relation.

'Sense' is given by the relations between one particular item and others in the vocabulary. For instance, the 'sense' of 'courage' is that it is the opposite of 'cowardice', that it is a kind of 'greatness', that it is the same as 'bravery', and so on; these are the relations that hold between 'courage' and other items in the same field.

Sense and Sense-relations

Of course such sense-relations as synonymy, antonymy, and so forth had been considered by earlier scholars, but their approach had been in terms of the traditional dichotomy between the form of a word and its meaning, which was assumed to be constant and always to accompany it (cf. above); if two words had the same meaning they were said to be synonymous, if they had opposite meanings they were antonymous, and so on—in other words entered into certain sense-relations because they already had, independently, a certain sense.

Lyons, however, does not accept this dualism of 'form' accompanied by a constant 'meaning'; he would say that if *in a certain context* (here we touch on his third main point) word x and word y are used as equivalents, and word x and word z are used as opposites, i.e. in this context they enter into these sense-relations of synonymy and antonymy, then these relations *are* their sense. For example, the sense of 'courage' is that it is a synonym of 'bravery', an antonym of 'cowardice', a hyponym of 'greatness' and so on, rather than it being the case that 'courage' has sense x, 'bravery' has sense x, therefore they are synonymous, and so forth.

What then are these sense-relations? They are defined in terms of certain 'primitive' notions such as 'assertion', 'denial', 'implication', and 'equivalance', and the main ones are as follows:

(a) *Incompatibility*. If I say that a thing is red, I imply that it is not green, not blue, not yellow and so on. If the assertion of one term of the set implicitly denies the others, then the relation of incompatibility holds between the members of the set.

(b) *Complementarity*.[13] If I say that a person is single, I imply that he is not married, and vice versa; if I say that someone is male, I imply that he is not female, and vice versa. Where the assertion of x implies the denial of y, and vice versa (and where x and y are the only terms involved), the relation of complementarity holds.

(c) *Antonymy*. If I say that someone is big, I imply that someone else is smaller. If I say that someone is beautiful, I imply that someone else is more ugly. Where the assertion of one term of one object implies the assertion of the other term of another object in a greater degree (i.e. this is essentially a matter of comparison), the relation of antonymy holds between these two terms.

Note however that one of the antonymous pair may be neutral or 'unmarked' in certain expressions: 'How wide is it?' 'It is three feet wide.' Neither of these statements implies that the thing in question *is* wide; the term refers to the whole scale. Compare 'How good is it?', but note that 'How bad is it?' *would* imply that it is bad. This emphasizes Lyons' third point again—that meaning is always bound to context. In these particular contexts 'good' and 'wide' do not stand in a relation of antonymy with 'bad' and 'narrow'; therefore their meaning here is different, since, as we stressed above, meaning depends on relations, not vice versa.

(d) *Hyponymy*. If I say that a thing is scarlet, I imply that it is red. If I say that a man is a carpenter, I imply that he is a tradesman. If the assertion of one term implies the assertion of the other, but *not* vice versa, the relation of hyponymy holds between them.

Hyponymy, like the other sense-relations, can be very interesting in showing up semantic non-equivalence between different languages. For instance, the German word *Gemüse* is usually translated into English as 'vegetables', but they are not really equivalent, since 'vegetable' includes 'potato' (i.e. 'potato' is a hyponym of 'vegetable'), whereas *Gemüse* does not include *Kartoffel.* Similarly there is a set of terms in Classical Greek (*tekton, iatros, kubernetes, auletes, skutotomos*, etc.) each of which has a corresponding term in English (carpenter, doctor, helmsman, flautist, cobbler). But in Greek all these are hyponyms of *demiourgos*, whereas in English they are not all hyponyms of any one term; so how is one to translate the Greek word? It is usually rendered 'tradesman' or 'craftsman', but a doctor would hardly like to use the tradesman's entrance!

Lyons believes that these are the fundamental sense-relations in a language; a language could not function without them. But it could work perfectly well without another relation often made much of:

(e) *Synonymy*. If we eliminated all cases of synonymy, we could still say anything we were able to before we did so. In considering this relation, let us recall some points we made earlier. Most people, we noted, have assumed that the meaning of a word is something constant that accompanies its form wherever it occurs. Therefore they are led to conclude that if two words differ in meaning in some context they must somehow do so in all contexts, because the meaning is a constant accompanying the form. If the difference is not one of cognitive meaning, then it must be one of emotive meaning. The result is the well-known claim that there are no real synonyms.

But Lyons would maintain that, like all sense-relations, synonymy must be bound to context. There is no such thing as *the* meaning of a word, only its meaning in this or that context—and it is quite possible for words to be synonymous in a particular context. For example, if I say that your house is big, I imply that it is large; if I say that it is large, I imply that it is big. If this bilateral implication holds, then 'big' and 'large' are synonymous in this context—though they may well not be so in some others.

In conclusion I would say that Lyons's work seems to embody several points relevant to a sound theory of semantics. Such a theory must recognize the fact that there are relations between items of language and features of the world about us. But it must also recognize that meaning involves another type of relation too: that between the different items of language. Thirdly, it must recognize that speech is an aspect of behaviour in a certain situational context, which is thus relevant to its meaning. He has two aims, which I believe he achieves: to make his theory objective (i.e. to make no appeal to inaccessible notions like 'concepts'), and to give answers which accord with the layman's feelings of what meaning really is.

NOTES AND REFERENCES

1. I am grateful to Professor F. R. Palmer for his comments on the written version of this paper.
2. This discussion is to be found in Plato's *Cratylus*, and also in Aristotle and Lucretius.
3. Cf. OGDEN and RICHARDS, *The meaning of meaning*, 1923, where meaning is said to be a relation of thoughts, words, and things.
4. Cf. BLOOMFIELD, L. *Language*, 1933, Chaps. 2 and 9.
5. Cf. SKINNER, B. F. *Verbal behaviour*, 1957.
6. Cf. odd remarks in HARRIS Z. S. *Structural linguistics*, 1951 and HOENIGSWALD H. M. *Language change and linguistic reconstruction*, 1960.
7. For a specimen article, cf. GOODENOUGH, W. H., Componential analysis and the study of meaning. *Language*, 32, 1956.
8. BENDIX, E. H. *Componential analysis of general vocabulary*, 1966.
9. KATZ, J. J. *and* FODOR, J. A. The structure of a semantic theory. *Language*, 39, 1963 and several other papers by Katz.
10. Cf. LYONS, J. *Structural semantics*, 1963, and *Introduction to theoretical linguistics*, 1968.
11. The original is of course in German, but a useful summary may be found in ULLMAN, S. *Semantics*, 1962.
12. Lyons in fact employs a broader notion than reference, that of 'application'; but we cannot go into this here. It should also be noted that 'sense' is the term used in his second book; in his earlier work he spoke of 'meaning'.
13. In his earlier work Lyons includes both (b) and (c) under Antonymy, distinguishing them as 'non-gradable' and 'gradable' antonymy. Lyons also considers a third type of 'oppositeness' of meaning, the relation holding between such pairs as 'buy' and 'sell', and 'husband' and 'wife', which he calls 'converseness'. He believes that it may play an important part in some languages though it is probably less frequent than the other two types.

Research and Aslib membership

B. C. Vickery

Assistant Director (Research & Development), Aslib

Aslib has had a Research and Development Department since 1959. It has received powerful financial support from the Office for Scientific and Technical Information (OSTI) and from industry, because it is recognized that a continuing department, accumulating experience, and working in close contact with operational services, is the most favourable environment for the advance of information science. Aslib's subscription income now contributes substantially to the support of the department. With the right pressure and the right encouragement from the Aslib membership, the department will continue to justify the support it receives.

In order to exert this pressure and encouragement, the membership needs a clear idea of what research aims to achieve, and what types of project are being carried out. The overall aim is to provide aids to the management of libraries and information services. To this end, the time of the R & D Department is occupied with four activities:

(a) Projects to investigate problems that are believed to be relevant to many, or to a broad group of Aslib members. The choice of these problems is guided by the advice of Council's Research Committee.
(b) Projects specially commissioned by OSTI and individually financed.
(c) Consultancies and contract work undertaken for particular member organizations, or groups of organizations, and individually financed.
(d) Transfer of departmental experience to the membership through advisory sessions and contributions to Aslib educational courses.

The last two types of activity give specific benefit to particular Aslib members on topics of direct interest to them. The first two types of project, on the other hand, result in reports (articles or other publications) that may or may not strike responsive chords among the membership. This will depend, first, on whether the projects have been wisely chosen, and second, on whether the membership has realistic expectations of what research is able to contribute.

In choosing projects, the aim of the department is to identify—by continuing contact with the library/information profession—problem areas where more knowledge is needed, and to attempt to establish that knowledge. Some of the problem questions that have given rise to projects over the last few years are:

—Can we provide a more detailed understanding of the varying patterns of literature use in technical libraries?[1]
—Can we learn more about meeting the needs of the chemist for quantitative data?[2]
—Can we give more effective aid to information workers who wish to construct a thesaurus?[3]

—How effective are abstracting journals in serving the needs of subject search?[4]

This year about ten projects are being carried out, and some account of the main themes will now be given. The first is directly related to the overall aim of the department.

(*1*) *Can we obtain more detailed understanding of what is involved in managing a library?* What kinds, levels and amounts of decisions does the librarian have to make? What are the recurring management problems being encountered on which librarians might welcome guidance?

An outline of this project has already been published.[5] Pauline Thomas and Valerie Ward have interviewed senior staff in about ten libraries of different types (industrial, special, government, educational, public, national), and these staff have completed diaries recording their activities over two weeks. This material is now being analysed.

(*2*) *What are reasonable labour times for jobs in information services?* With the growing pressure on information managers to watch costs, wider and more firmly based knowledge of reasonable standards should be of value. A project on the economics of library and information processes has been going on for some time, and has already led to publications.[6, 7, 8]

Standard times (and their variation according to circumstances) are being established by Stephen Robertson, Rose Reynolds and Anne Wilkin. Library staff are interviewed, operations are flowcharted, diaries are designed and used to record work done and time taken, and the results are analysed statistically.

(*3*) *How valuable are short educational courses in the library and information field?* Along with the expansion of full-time education in library schools, there has been considerable growth in the provision of short courses—introductory or on specialized topics—as a form of further education. Aslib Education Department has contributed notably to this development. How well are such courses meeting the needs of library and information management? How can their effectiveness be routinely assessed? A pilot study on these lines has been carried out by Margaret Slater, and a longer investigation is about to start.

(*4*) *Can we obtain more guidance on the relative costs and effectiveness of different types of visual index?* Despite the coming of the computer, the visually searched index is still by far the most used retrieval tool, and indeed much computer time is spent in producing such indexes. Two linked projects are at the advanced planning stage.

One is concerned with the costs of computer-produced indexes. This has grown out of an earlier study to survey the availability of programs to produce indexes.[9] Lucille Campey now plans to use two program packages to produce about a dozen different indexes, all in KWIC or KWOC format but varying as to source of keyword (ranging from title words to assigned descriptors) and selection technique, and to compare costs.

The other project is concerned with searching some visual indexes (two of which may be a KWIC and KWOC from the first project), and comparing performance and acceptability. Suman Datta will supervise index production and searching. The documentary base for both these projects will be that developed by Keen and Digger.[10]

(5) *How can better use be made by specialist libraries and information services of the large magnetic tape files now available?* Since we calculate that over 3½ million references annually are now being recorded on tape, there is considerable need to explore whether economic use can be made of these files. Two projects are connected with this theme.

In one, Jane Wainwright and Jacqueline Hills are investigating the possibility of a book announcement service, aimed at libraries rather than individuals, derived from the weekly MARC tapes of the British National Bibliography and the Library of Congress. Profiles have been constructed for ten libraries, and selected output delivered for six weeks for evaluation. The project itself is being conducted by on-line search of current tapes, from a terminal housed at Aslib, but costs will be estimated for production running in batch mode.

In the other project, John Martyn and Linda Torrisi are exploring how effectively, and at what cost, a special interdisciplinary service could extract relevant references from a series of large disciplinary tapes. The investigation is in the form of a case study of a particular service, the Biodeterioration Information Centre, and the tapes likely to be examined include those from the *Science Citation Index, Chemical Abstracts, MEDLARS* and *Biological Abstracts.*

(6) *Can we learn more about the use and users of services offering broad business and commercial information to the general public?* Aslib surveys in the past have concentrated on scientific and technical information. In this project (and in a subsequent one on social science libraries) attention is to be turned to other fields. Averil Osborn will collect data from the users of up to ten libraries, by questionnaire and by looking at telexed and postal requests.

This note has surveyed the main themes of current research and development projects at Aslib. How can the membership make best use of this work? The references at the end indicate the immediate result of a research project: it is a report containing information. The information may include factual data, methods of investigation, interpretations and conclusions. It cannot include a plug-in kit for immediate use by an individual library or information service, because any such kit must be designed for the particular conditions of that service. Between the establishment of a research result and its application there is work to be done: a study of the situation to which the result is to be applied. It is on precisely that work that the consultancy and advisory activities of the department are engaged.

There is another aspect of the matter that should be remembered: many of the library and information units within Aslib are small, and their resources are stretched to the limit in providing the best service they can. There is little opportunity for them to spend time in following up leads suggested by research. Perhaps they can best be served by research and development that aims to improve the larger national libraries and information services, on which the small units must rely.

The R & D Department at Aslib will be of most value to the membership if members—in addition to their generous financial support—actively press their views as to problems that need investigation. By demanding much, the membership will keep the minds of research and development workers focused on the practical problems that so urgently face the information world. Because these problems are complex and intractable, the profession should accept that research into them will only slowly yield results, and that these will rarely be dramatic. But a continued attack on them, with membership encouragement, will bear fruit.

REFERENCES

1 SLATER, MARGARET *and* FISHER, PAMELA. *Use made of technical libraries.* Aslib Occasional Publication No. 2, 1969.

2 (a) MOUNTSTEPHENS, BRENDA, OSBORN, AVERIL *and* SLATER, MARGARET. *Quantitative data in science and technology.* Aslib Occasional Publication No. 7, 1971.

(b) SLATER, MARGARET, OSBORN, AVERIL *and* PRESANIS, ALEXANDRA. *Data and the chemist.* Aslib Occasional Publication No. 10 (in press).

3 GILCHRIST, ALAN. *The thesaurus in retrieval.* Aslib, 1971.

4 MARTYN, JOHN *and* SLATER, MARGARET. Tests on abstracting journals. *J. Doc.*, **20**, 4, December 1964, p. 212–35; and **23**, 1, March 1967, p. 45–70.

5 THOMAS, PAULINE *and* WARD, VALERIE. Librarians and the management of library systems. *Aslib Proc.* **24**, 4, April 1972, p. 229–32.

6 REYNOLDS, ROSE. *Selective bibliography on measurement in library and information services.* Aslib, 1970.

7 ROBERTSON, S. E., REYNOLDS, R., *and* WILKIN, A. P. Standard costing for information systems. *Aslib Proc.* **22**, 9, September 1970, p. 452–7.

8 WILKIN, A. P., REYNOLDS, R., *and* ROBERTSON, S. E. Standard times for information systems: a method for data collection and analysis. *J. Doc.*, **28**, 2, June 1972, p. 131–50.

9 CAMPEY, LUCILLE. *Generating and printing indexes by computer.* Aslib (in preparation).

10 KEEN, E. M. *and* DIGGER, J. A. *Report of an information science index languages test.* College of Librarianship Wales (forthcoming report).

Letters to the Editor

Dear Sir,

CURRENT AWARENESS BULLETINS IN UNIVERSITY LIBRARIES

In Mr Hale's useful survey of information services in university libraries (May 1972) he states that these services are developing in a piecemeal and haphazard manner. This is true, and to some extent is inevitable.

I could however suggest some coordination in the provision of Current Awareness Bulletins, which a few of us produce, mainly for our own readers. The two we produce at Surrey we sell for £10 p.a., but if more libraries produced a bulletin, and were willing to exchange a number of copies, we should be able to agree areas for others to cover. This was advocated by the Technological University Librarians, but was never taken up by more than a few of us. The only real cooperation is that Bradford University Library send us twenty-four copies of its Civil Engineering Bulletin in exchange for twenty-four copies of our Mechanical Engineering Bulletin. These are sent to academic staff and research students.

Current Awareness Bulletins take time and effort, but we know that they are used and appreciated. They also allow our staff to use their subject knowledge, and this makes their work more interesting. If more bulletins were available for exchange, we could all, for the cost of producing one bulletin, offer readers a better service.

Yours faithfully,
R. F. EATWELL
Librarian

University of Surrey,
Guildford,
Surrey.
31st May 1972

Dear Sir

INDEXES TO CHEMICAL ABSTRACTS

In the October 1971 issue of *Aslib Proceedings*, I am reported (I believe correctly) as saying certain things about the development of indexes for issues of *Chemical Abstracts* ('External information services and the small user', p. 536–40).

My remarks have brought a very friendly, and very informative, rejoinder from Ralph O'Dette of Chemical Abstracts Service.

I think that readers of *Proceedings* are entitled to be given the right information, and I would be grateful if the following extracts from Mr O'Dette's letter to me could be reproduced in a forthcoming issue:

> The purpose of this note is primarily to comment on one of the paragraphs attributed to you, from the bottom of p. 539 of the *Proceedings* and continuing to p. 540. If one does not read the words carefully, one is likely to take away a generally correct impression; however,

one can infer some things from the paragraph in question which are misleading. In the event there are some misunderstandings; I will attack the paragraph as though you said and meant precisely what is there.

There is no plan to 'considerably expand' the *CA* issue indexes. There is a technical possibility—more on that below—that those indexes could be greatly changed in character in a few years, but there is no commitment to do so and certainly no plan.

If you had said 'volume index' rather than 'issue index', you would have been closer on target. For several years now, the index entries prepared for the six-monthly volume indexes have been entered into the computer system. Gradually, beginning with Volume 66, the various volume indexes have been converted to computer compilation, formating, and composition, so that by the time Volume 71 arrived, all of the various volume indexes were being assembled and output through computer technology. This fact made possible, among other things, the issuance of the first Integrated Subject File as the machine-readable counterpart of the Volume Subject Indexes plus molecular formulae, Registry Numbers, *CA* Section Numbers, and various sort keys to facilitate machine merging. During the conversion period we saw the introduction of the Index Guide and the Registry Number Index.

The volume indexes will indeed appear more promptly. Only a year or so ago, *CA* Volume Indexes were around 16 months behind the last issue of the volume covered. At the moment, Volume 75 (July–December 1971) has been indexed and edited and is in production. With reasonable luck, it will be mailed to subscribers in July 1972, about seven months past the end of the volume.

As we gradually convert all *CA* Sections to 'one-time analysis', with abstracting and indexing virtually simultaneous, we will have the capability to produce quarterly, monthly, or even weekly indexes of the same character as the present six-monthly indexes. Whether we *will* produce them is another matter.

Meanwhile, the issue (i.e. weekly) indexes, particularly the keyword subject indexes, continue to be largely for short term use.

Yours sincerely,
W. E. BATTEN
Director

United Kingdom Chemical Information Service,
Burlington House,
London W1V 0BN.
9th May 1972

CURRENT AWARENESS LIST

Recent additions to the Aslib library catalogue are broken down into twelve broad groups, whose coverage is indicated below. These groups are not mutually exclusive but it is hoped that users will find them helpful in scanning for new items of interest.

User Studies
Analyses of information-seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory.

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject Organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies; reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies; directories.

JANET WALKLEY
Librarian

CURRENT AWARENESS LIST

Items are available in the Aslib Library and may be borrowed unless marked to indicate reference copies.*

User Studies

GARVEY, WILLIAM D. *and others*
Research studies in patterns of scientific communication: 1. general description of research program.
Information Storage and Retrieval, vol.8, no.3, June 1972, p.111–22.
The design of a series of 78 studies of information-exchange activities of scientists and engineers.

WOLEK, F.
Preparation for interpersonal communication.
JASIS, vol.23, no.1, January–February 1972, p.3–10.
Methods used by engineers and scientists to enrich their understanding of a technical subject prior to interpersonal communication.

NEUFELD, VICTOR R. *and* WOODSWORTH, ANNE
A survey of physician self-education patterns in Toronto: part II: use of journals and personal filing systems.
Canadian Library Journal, vol.29, no.2, March–April 1972, p.104–9.

MALTBY, ARTHUR
Catalogue use: some results from the U.K. catalogue use survey.
Catalogue and Index, no.25, Spring 1972, p.7,12.
A survey of academic, national and public library catalogues.

EATON, ELIZABETH S.
Library orientation methods: J. Hillis Miller Health Center Library Program.
Bulletin of the Medical Library Association, vol.60, no.1, January 1972, p.133–7.
A taped tour and an instruction tape on *Index Medicus*, used at J. Hillis Miller Health Center Library.

DANNENBERG, DENA
A course in information techniques for dental students.
Bulletin of the Medical Library Association, vol.60, no.1, January 1972, p.111–14.
A course plan for introducing literature-searching and critical skills to dental students.

Communication and Knowledge

SHERROD, JOHN
Information conglomerates.
Drexel Library Quarterly, vol.8, no.1, January 1972, p.9–14.
Library co-operation and mergers and their effect on U.S. Federal libraries.
Presented at 8th Annual National Information Retrieval Colloquium, Philadelphia, 1971.

CUADRA, CARLOS A.
Working Group summary on network planning.
Law Library Journal, vol.65, no.1, February 1972, p.13–18.
Recommends the development of a comprehensive national plan to facilitate co-ordination of American libraries and information centres.

MARLOTH, HEINZ
Stand des Dokumentations-und Informationswesens in Industrielsereich der Bundesrepublik Deutschland.
Nachrichten fur Dokumentations, vol.23, no.1, February 1972, p.27–9.
Current state of industrial documentation and information in the Federal Republic of Germany.

MIKHAILOV, A. I.
Scientific and technical information and effectiveness of science.
Revista dell'Informazione, vol.3, no.1, February 1972, p.74–7.
The information explosion and some Soviet steps to master it.

ROGERS, C. E.
Government libraries in the social sciences: a review of the INFROSS investigation.
Bulletin of the Circle of State Librarians, vol.20, no.1, January 1972, p.9–13.
The services to social scientists provided by government libraries as indicated by INFROSS.

GARVEY, WILLIAM D. *and* GRIFFITH, BELVER C.
Communication and information processing within scientific disciplines: empirical findings for psychology.
Information Storage and Retrieval, vol.8, no.3, June 1972, p.123–36.
Results of an investigation into the information flow in psychology.

Information Processing Systems

ELWIN, C. E.
Some aspects on integration of information services in medicine, biology and chemistry at a multidisciplinary documentation center.
Information Storage and Retrieval, vol.8, no.2, April 1972, p.49–56.

Paper given at 3rd International Conference on Mechanized Information Storage and Retrieval Systems, Cranfield Institute of Technology.

GREEN, C. D.
Some problems of the indexing of specialist material drawn from several disciplinary systems.
Journal of Documentation, vol.28, no.1, March 1972, p.37–43.
The DUNMIRE (Dundee University Numerical Methods Information Retrieval Experiment) project to evaluate 4 abstracting journals with a view to creating a specialist data base from parts of each.

BLANK, H. *and* BORTSCH, H.
Eine mittelgrosse multidisziplinäre wissenschaftliche Literaturdokumentation mit einem Kleinrichner: grundsatzlicher und datentechnischer Aufbau.
Nachrichten fur Dokumentation, vol.23, no.2, April 1972, p.58–64.
A medium-sized, multidisciplinary information system with a mini-computer and no thesaurus, greater effort being invested in the search problem.

DAVISON, P. S.
Operating large-scale, broad coverage CA and SDI services.
Information Scientist, vol.6, no.1, March 1972, p.15–31.
The operation of manual current awareness and selective dissemination of information services by the Scientific Documentation Centre.

BARKER, F. H. *and others*
Towards automatic profile construction.
Journal of Documentation, vol.28, no.1, March 1972, p.44–55.
An UKCIS experiment for the computerized refinement of user-constructed SDI profiles.

BRIGGS, LOUIS *and others*
A document analysis and retrieval system.
Geoscience Documentation, vol.3, no.3–4, June–August 1972, p.72–5.
A time-shared information retrieval system at the University of Michigan, Laboratory of Subsurface Geology.

KUNEY, JOSEPH N. *and others*
Implementation of information retrieval systems.
Drexel Library Quarterly, vol.8, no.1, January 1972, p.55–69.
A selection of problems relating to information dissemination.
Papers presented at 8th Annual National Information Retrieval Colloquium, Philadelphia, 1971, with ensuing discussion.

HARMON, GEORGE H. *and others*
Design of information retrieval systems.
Drexel Library Quarterly, vol.8, no.1, January 1972, p.33–53.
Papers at 8th Annual National Information Retrieval Colloquium, Philadelphia, 1971, with ensuing discussion.

SALTON, GERARD
The 'Generality' effect and the retrieval evaluation of large collections.
JASIS, vol.23, no.1, January–February 1972, p.11–22.
The validity of upward extrapolation of data from a small subsection of the collection in retrieval evaluation.

AKHORI, H., *and* SAKURAI, K.
Information search using holography.
Applied Optics, vol.11, no.2, February 1972, p.413–15.
Two methods for recording a hologram plate suitable for information search are discussed.

KENNARD, OLGA *and others*
Cambridge Crystallographic Data Centre: 1 bibliographic file.
Journal of Chemical Documentation, vol.12, no.1, February 1972, p.14–19.
The Centre's activities in retrieving, evaluating, synthesizing and disseminating structural data.

Language and Indexing

JONES, KAREN SPARCK
A statistical interpretation of term specificity and its application.
Journal of Documentation, vol.28, no.1, March 1972, p.11–21.
It is suggested that specificity should be interpreted statistically, as a function of term use rather than of term meaning.

MARGOT, J.-M.
Problèmes de l'analyse automatique de textes.
Nachrichten, Nouvelles, Notizie, vol.48, no.2, 1972, p.77–83.
Problems connected with automatic text analysis.

BRIGGS, LOUIS I. *and* BRIGGS, DARINKA P.
Thesaurus for Geologic Document Analysis and Information System (DAIS).
Geoscience Documentation, vol.3, no.3–4, June–August 1972, p.76–88.
A thesaurus compiled for use in the time-shared IRS at the University of Michigan, Laboratory of Subsurface Geology.

WOLFF-TERROINE, M. *and others*
Improved statistical methods for automatic construction of a medical thesaurus.
Methods of Information in Medicine, vol.11, no.2, April 1972, p.104–13.
The investigation of various clustering techniques from a range of similarity criteria.

OTRADINSKII, V. V.
Variant slovarnogo kontrolya priformal-

izovannom indeksirovanii dokumentov i zaprosov.
Nauchno-tekhnicheskaya Informatsiya, Seriya 2, no.1, 1972, p.9–12.
A possible dictionary control procedure in formalized document indexing and query formulation.

BERARDINI, CLAUDE
Préparation d'un thésaurus d'astronomie et automatisation de la documentation de l'Observatoire de Paris-Meudon.
INSPEL, vol.7, no.1, January 1972, p.8–1.
The compilation of a thesaurus for astronomy and the automation of information work at the Paris Observatory.

PREISLER, WERNER
Zur Gestaltung eines Thesaurus.
Informatik, vol.19, no.1, 1972, p.22–8.
A formal definition of the structure of thesauri.

Classification and Cataloguing

BRITISH STANDARDS INSTITUTION
Universal decimal classification: English full edition: 4th international edition: UDC 681.8/.9 technical acoustics: musical instrument engraving and sculpturing machines.
London: the Institution, 1972. 580 06977 x 24p. (BS 1000[681.8/.9]: 1972; FID publication no.179)

BRITISH STANDARDS INSTITUTION
Universal decimal classification: English full edition: 4th international edition: UDC 685: travel, sports, games and other equipment.
London: the Institution, 1972. 580 06697 5 34p. (BS 1000[685]: 1972; FID publication no. 1.)

BRITISH STANDARDS INSTITUTION
Universal decimal classification: English full edition: 4th international edition: UDC 9: geography: biography: history.
London: the Institution, 1972. 580 06897 8. 52p. (BS 1000 [9]: 1972; FID publication no.179.)

BATTY, DAVID
A close look at Dewey 18: alive and well and living in Albany.
Wilson Library Bulletin, vol.46, no.8, April 1972, p.711–17.
Reviews the innovations in the 18th edition of the Dewey Classification.

MCKINLAY, JOHN
Expanding Australia.
Australian Academic and Research Libraries, vol.3, no.1, March 1972, p.1–4.
The Dewey Decimal Classification's official expansion for Australian geography.

CLEGG, DAVID
The growth of SfB in the United Kingdom.
CIIG Bulletin, vol.2, no.2, April 1972, p.2–4.
Plans for the forthcoming revision of SfB, the construction industry classification scheme.

SZAVA-KOVATS-ENDRE
Az osztályozás mai helyzete és értékelése a tudományos tájékoztatás szempontjából.
Tudományos és Muszaki Tájékoztatás, vol.19, no.2, February 1972, p.75–93. The present state of classification and its evaluation.

DIEMER, ALWIN
Klassifikation, Thesaurus und was dann? das Problem der 'dritten Generation' in Dokumentation und Information.
Nachrichten für Dokumentation, vol.23, no.2, April 1972, p.52–7.
Examines classification theory and practice from a dynamic and evolutionary viewpoint as opposed to the static one hitherto prevailing.

ÖHMAN, EINAR
Die DK - Kritik von H. Arntz im Lichte von Konkordanzuntersuchungen zwischen DK und Thesauren.
Nachrichten fur Dokumentation, vol.23, no.2, April 1972, p.65–8.
A reply to recent articles by H. Arntz. Investigates to what extent UDC concords with various thesauri.

IRVINE, RUTH
Southampton cataloguers' reactions to local MARC.
Program, vol.6, no.2, April 1972, p.144–52.
Teaching cataloguers at Southampton University Library to produce records in MARC format.

BARNES, G. A. *and* MUSK, K. N.
A printed catalogue in the ex-MinTech libraries.
Bulletin of the Circle of State Libraries, vol.20, no.1, January 1972, p.6–8.

Mechanization

LOWRY, W. KENNETH
Use of computers in information systems.
Science, vol.175, no.4024, 25 February 1972, p.841–6.
Bell Telephone Laboratories use of computers for a wide range of information activities.

WEICKMANN, CHRISTOPH
Schatzung der Kosten bei der Anwendung der EDVA ROBOTRON 300 in Bibliotheken und Informations und Dokumentations-stellen des Hoch -und Fachschulwesens.
Zentralblatt fur Bibliothekswesen, vol.86, no.4, April 1972, p.193–200.
Costing the installation in East German university libraries of computer equipment.

VALENTINE, VIOLET
So—data processing never fails?
American Libraries, vol.3, no.3, March

1972, p.313–14.
A brief bibliography on the failed use of computers in libraries.

THOMPSON, VALERIE
A computerized serials list at Massey University Library.
New Zealand Libraries, vol.35, no.1, February, 1972, p.9–12.

BARKER, A. S. *and* COLERIDGE, K. A.
Computer applications at Victoria University Library.
New Zealand Libraries, vol.35, no.1, February 1972, p.13–16.
The automated compilation of a serials holdings list.

SEARLE, R.H. *and* CORBETT, L.
The computerized, punched card loans control system at AWRE, Aldermaston.
Program, vol.6, no.2, April 1972, p.153–66.
Use of an IBM 029 card punch to prepare computer input to update and process library loans files.

PEAKE, DOROTHY G. *and* GLOCK, PAM
An IBM circulation system at the University of New South Wales.
Australian Academic and Research Libraries, vol.3, no.1, March 1972, p.21–32.
Technical specifications plus operating procedures.

RANDALL, G. E.
The inventory of a special library collection.
Special Libraries, vol.63, no.3, March 1972, p.130–4.
Stock control in a mechanized special library.

DRIVER, E. H. C. *and others*
The Birmingham Libraries' Cooperative Mechanization Project: progress report, June 1970–January 1971.
Program, vol.6, no.2, April 1972, p.120–6.
Covers the cataloguing system, costing exercise and machine progress.

IRVINE, RUTH *and* NICHOLAS, GLORIA
MARC-produced cards: production of cards from MARC-compatible cataloguing tapes before computer input.
Catalogue and Index, no.25, Spring 1972, p.8–9.
The system evolved for the Southampton University Library.

WALL, R. A.
Automation at Loughborough: a status report.
Program, vol.6, no.2, April 1972, p.127–43.
Covers especially the alphabetical subject index, serials systems and the minimal-input cataloguing system.

WILLIAMS, M. D.
Experiences of IIT Research Institute in operating a computerized retrieval system for searching a variety of data bases.
Information Storage and Retrieval, vol.8, no.2, April 1972, p.57–75.
Paper given at 3rd International Conference on Mechanized Information Storage, and Retrieval Systems, Cranfield Institute of Technology, 20th–23rd July 1971.

GERSON, GORDON M.
A computer-aided classification and retrieval system for United States patents.
Information Storage and Retrieval, vol.8, no.3, June 1972, p.137–50.
The design and testing of the classification for the U.S. Patent Office.

MONDINI, ALBERTO
Trends in teleprocessing.
Revista dell'Informazione, vol.3, no.1, February 1972, p.98–103.
New developments in on-line computing.

FERN, ROGER *and* BAGNALL, JOHN
An on-line editing program for bibliographic records.
Program, vol.6, no.2, April 1972, p.117–19.
The Editrec program for use with acquisitions system in Newcastle University Library.

Subject Organization

WENTZEL, I. *and* GRALEWSKA, A.
SLIP programs in an integrated manual–machine information system: the Rock Mechanics Information Service.
Program, vol.6, no.2, April 1972, p.101–16.
The computer-assisted production of *Rock Mechanics Abstracts*.

ROSE, RICHARD *and others*
A demand-driven file of British political history.
Social Science Research Council Newsletter, no.14, March 1972, p.30–2.
The Strathclyde Political Data File.

ROTHMAN, JOHN
The *New York Times* Information Bank.
Special Libraries, vol.63, no.3, March 1972, p.111–15.
Scheduled to be in operation in 1972, the bank makes available abstracts of newspaper articles for on-line retrieval, plus microfiches of the original articles.

SHRIMPTON, A. P.
Information requirements in a consulting engineer's office.
CIIG Bulletin, vol.2, no.2, April 1972, p.11–12.
How the information section of Freeman Fox and Partners tries to satisfy the company's information needs.

APTED, SHIELA
Special information centres for literature.
Australian Academic and Research Libraries, vol.3, no.1, March 1972, p.14–20.
The organization of special collections on

individual authors in English literature, with descriptions of 3 such collections.

PLOWDEN, ANNE
An information system for construction.
Building, vol.222, no.6722, 29th March 1972, p.121.

EILERS, HANS G.
Vorschlag für eine internationale, zentralisierte Verpackungsdokumentation.
Nachrichten fur Dokumentation, vol.23, no.2, April 1972, p47–51.
Proposal for an international and centralized information service in the field of packaging.

HOUGHTON, BERNARD
Technical information sources: a guide to patent specifications, standards and technical reports literature.
2nd ed. London: Bingley, 1972. 0 85157 126 3
119p.

FRICKE, PETER H.
Index of Current Maritime Research.
Social Science Research Council Newsletter, no14, March 1972, p.28–9.
The compilation of a directory to current social science research in maritime fields.

GROGAN, DENIS
More case studies in reference work.
London: Bingley, 1972. 0 85157 124 7
293p.

Reprography

MARRIOTT, PETER
An experiment in computer originated microfilm (COM).
NRCd Bulletin, vol.5, no.2, Spring 1972, p.39–41.
Cornwall County Library's catalogue on COM.

MARCO, MARCO DE
Data transmission.
Revista dell'Informazione, vol.3, no.1, February 1972, p.91–7.
The basic technology behind data transmission.

FAIRCLOUGH, R. H.
Original or facsimile.
New Library World, vol.73, no.863, May 1972, p.291–4.
Criteria for map selection, and the possibility of acquiring facsimiles of expensive ones.

Printing and Publishing

SEEBER, GERD
Big future for the wordshrinkers?
New Scientist, vol.54, no.792, 20th April 1972, p.148–50.
Current problems in micropublishing.

THORPE, P.
An evaluation of the rheumatology periodical literature used in Britain and the USA.
Methods of Information in Medicine, vol.11, no.2, April 1972, p.119–21.
A citation analysis and ranking of periodicals in the field of rheumatology and arthritis.

BUNTROCK, H.
A statistical analysis of literature, in agricultural economics and rural sociology.
Quarterly Bulletin of the International Association of Agricultural Librarians and Documentalists, vol.16, no.1, 1972, p.15–28.
A sample survey of agricultural information services coverage, citations, etc.

ULMER, EUGEN
Copyright problems arising from the computer storage and retrieval of protected works.
Revue Internationale du Droit d'Auteur, no.72, April 1972, p.34–151.

Administration and Management

STRAUSS, LUCILLE J. *and others*
Scientific and technical libraries: their organization and administration, 2nd ed. by Lucille J. Strauss, Irene M. Shreve and Alberta L. Brown.
New York, London: Wiley-Becker-Hayes, 1972. 0 471 83312 6 x
450p., bibliog.

MARTELL, CHARLES
Administration: which way—traditional practice or modern theory?
College and Research Libraries, vol.33, no.2, March 1972, p.104–12.
Traditional vs. modern methods in academic library management: concentrates on leadership, group processes and organizational structure.

EVANS, EDWARD *and others*
Review of criteria used to measure library effectiveness.
Bulletin of the Medical Library Association, vol.60, no 1, January 1972, p.102–10.
Reviews the criteria of accessibility, cost, user satisfaction, response time, cost-benefit ratio, and use.

WHITE, HERBERT S. *and others*
Management of information retrieval systems.
Drexel Library Quarterly, vol.8, no.1, January 1972, p.71–83.
A selection of problems relating to library management.
Papers presented at 8th Annual National Information Retrieval Colloquium, Philadelphia, 1971, with ensuing discussion.

STEGEMAN, HAGEN
Kostenrechnung einer Datenbank für Umfragen.

Nachrichten für Dokumentation, vol.23, no.2, April 1972, p. 69–79.
Cost accounting for a data bank of survey information.

BINYON, MICHAEL
University libraries face crisis after rapid rise in book costs.
Times Higher Education Supplement, no.30, 5th May 1972, p.8.
The current financial plight of UK university libraries.

ARMSTRONG, ALAN
A cost-determining formula for library staff.
Library Association Record, vol.74, no.5, May 1972, p.85–6.

NOVAK, MARY
Guides in small office libraries.
CLIG Bulletin, vol.2, no.2, April 1972, p. 13–15.
A few suggestions on using plans, guides and effective periodical display to promote library use.

CASELLAS, ELIZABETH
Library of Congress proof slips: the overlooked selection medium for business libraries.
Special Libraries, vol.63, no.3, March 1972, p.144–50.
Survey of book selection methods in US business libraries, with special emphasis on LC proof slips.

ANDERSON, JAMES F.
Break-even point for a proof slip operation.
College and Research Libraries, vol.33, no.2, March 1972, p.119–21.
What number of annual accessions is sufficient to utilize economically LC proof slips and a Xerox copier for cataloguing?

MCNALLY, PAUL
The organization and service of an audio-visual collection in college libraries.
Australian Academic and Research Libraries, vol.3, no.1, March 1972, p.33–47.
With special reference to Australian conditions.

GRIEDER, E. M.
Ultrafiche libraries: a librarian's view.
Microform Review, vol.1, no.2, April 1972, p.85–100.
Critical survey of the suitability for college collections of the Encyclopaedia Britannica and NCR ultrafiche libraries.

RUML, TREADWELL
Ultrafiche libraries: the publishers respond.
Microform Review, vol.1, no.2, April 1972, p.101–2.
A rejoinder to E. M. Grieder's article in the same issue criticizing Encyclopaedia Britannica's ultrafiche library.

GRIEDER, E. M.
A rejoinder.
Microform Review, vol.1, no.2, April 1972, p.109–11.
A reply to the reply of the publishers to Grieder's article in the same issue criticising the Encyclopaedia Britannica and NCR ultrafiche libraries.

MCGEE, ROB
Key factors of circulation system analysis and design.
College and Research Libraries, vol.33, no.2, March 1972, p.127–39.
Components common to manual, machine-aided and computer-based loans systems, and their use in system analysis and design.

VAN DE WALLE, RAPHAËL
Manuele en automatische informatieverwerking in een fotoarchiv van Kunstwerken.
Open, vol.4, no.2, February 1972, p.79–100.
Manual and automated information processing of photographs of works of art.

Library Systems

TYSHKEVICH, N. I.
Coordination and cooperation of general and special (scientific and technical) libraries of the USSR in scientific and technical information.
INSPEL, vol.7, no.1, January 1972, p.2–7.

TORNUDD, ELIN
Coordination and cooperation of special and general libraries in scientific and technical information.
INSPEL, vol.7, no.1, January 1972, p.15–17.
The situation in Finland.

INDIAN INSTITUTE OF TECHNOLOGY
Survey of the IIT libraries: preliminary report.
Kanpur: the Institute, February 1972 [iv]. 39p.

VOGT, WINOLD
Die Bibliotheken und das geplante juristische Informationssystem.
Zeitschrift für Bibliothekswesen und Bibliographie, vol.19, no.1, 1972, p.55–60.
How libraries will function in the planned West German legal information system.

ZESEWITZ, HELMUT
Moglichkeiten und Probleme der Integration zwischen dem Bibliotheks-und Informationswesen an Hochschulen.
Zentralblatt fur Bibliothekswesen, vol.86, no.4, April 1972, p.201–12.
Integrating the library and information functions in East German university libraries.

WEINSTOCK, MELVIN
Some observations on efficiency and size.

Drexel Library Quarterly, vol.8, no.1, January 1972, p.14–16.
The advantages and disadvantages of library centralization.
Presented at 8th Annual National Information Retrieval Colloquium, Philadelphia, 1971.

LINE, MAURICE
Interlibrary loan requests refused by libraries: the scope for improvement.
NCL Newsletter, no.12, April 1972, p.8–9.
The reasons why libraries decline to lend when requested to make an interlibrary loan.

WILLIS, MICHAEL
The evaluation of N.C.L.'s locations' experiment.
NCL Newsletter, no.12, April 1972, p.7–8.
The NCL's experiment whereby in reply to ILL requests, locations are given whereas, previously, the requests were circulated.

HUNTER, B. R.
Inter-library lending of Slavonica.
Solanus, no.7, February 1972, p.5–10.
Experience at the British Library of Political and Economic Science.

Professional Activity

WHATLEY, H. A.
British librarianship and information science, 1966–70.
London: Library Association, 1972. 0 85365 175 2.
xiv, 712p.

KALMAR, VERA *and others*
The place and role of the technical and scientific libraries within IFLA.
INSPEL, vol.7, no.1, January 1972, p.18–25.
Recommends the establishment of a subsection for scientific and technical libraries within IFLA's Special Libraries Section.

STAVELEY, RONALD
A theory for practical education in librarianship.
Journal of Documentation, vol.28, no.1, March 1972, p.1–10.
The use of the ideas of John Macmurray to elaborate a philosophical framework for library education.

HILL, BARBARIE
The development of education for medical librarians.
Bulletin of the Medical Library Association, vol.60, no.1, January 1972, p.121–32.
History and current situation.

O'REILLY, R. N.
The study of librarianship.
New Zealand Libraries, vol.35, no.1, February 1972, p.34–8.
The scope of library education.

JACKSON, SIDNEY L.
Materials for teaching library history in the U.S.A.
Journal of Education for Librarianship, vol.12, no.3, Winter 1972, p.178–92.
A guide to the literature of library history.

KNIGHTLY, JOHN J. *and* SAYRE, JOHN L.
Self-paced instruction for library science students.
Journal of Education for Librarianship, vol.12, no.3, Winter 1972, p.193–7.
A method of teaching library science based on units which the student tackles at his own speed and on which he is tested before moving to the next unit.

BOCK, G. *and others*
Zur Institutionalisierung informationswissenschaftlicher Forschung: ein Diskussionsbeitrag aus dem Blickwinkel der Bibliothek.
Zeitschrift für Bibliothekswesen und Bibliographie, vol.19, no.2, 1972, p.101–6.
Library and information science research in Federal Germany.

MEMBERS' ADVERTISEMENTS

Acceptance of advertisements for publication in Proceedings *does not imply Aslib support for or endorsement of the goods or services advertised.*

Members' advertisement rates: first 15 words (minimum), 50p; 3p for each additional word. 10p if box number required. (No agency discount.) A separate section of these columns is available to non-members at £3 per s.c.i.

Translations services

MEDICAL AND HIGHLY SPECIALIZED SCIENTIFIC TRANSLATIONS. S.M. Bonnekamp, FIL, Member of the Translators' Guild (Med. Science & Lit.), 47 Firs Close, Muswell Hill, London, N10. Tel. 01-883 3962 during office hours. After office hours an automatic telephone answering machine will record messages.

BUILDING AND CIVIL ENGINEERING TRANSLATIONS from Russian and German into English. G. L. Cairns, MIL, 19 Kingsley Place, London N6. Tel. 01-340 8990.

TECHNICAL SWEDISH, DANISH, NORWEGIAN translated by J. T. Craddock, B COM, FIL, Ekard, Ray Park Avenue, Maidenhead, Berks. Maidenhead 24931.

RUSSIAN/ENGLISH TRANSLATIONS. Twenty years' experience Government Department. Native Russian. A. de Merindol, 19 Ingelow House, Kensington, W8. 01-937 6788.

JAPANESE/ENGLISH RUSSIAN/ENGLISH translations. Chemistry, medicine, biology, zoology. D. A. Fraser, BA, MIL, 22 Gresley Road, London N19 3JZ. Tel: 01-272 5664.

WILFRED E. GOODAY, ARSM, DIC, C.ENG, MIMM, FIL. Member of Translators' Guild, Romanian and French. 161 Rivermead Court, London SW6. RENown 1912.

SCIENTIFIC TRANSLATIONS FROM JAPANESE, CHINESE, RUSSIAN, CZECH and East and West European languages into English and/or German. A. K. Henn, B.SC, 'Glenside', Lower Leigh Rd., Pontnewynydd, Pontypool, Mon. Tel Pontypool 3689 (after 6 p.m.).

MEDICAL, PHARMACEUTICAL, BIOLOGICAL translations from French, Romanian and Portuguese into English and from English into French and Romanian. Dr J. Jacobson, 94 Temple Fortune Lane, NW11. 01-455 1010.

TECHNICAL TRANSLATIONS from Russian, German and Polish into English. B. Klipstein, BSC(HONS), 1 Glenview Grove, Shipley, Yorkshire. Tel. Shipley 58215.

TECHNICAL AND COMMERCIAL translations from English into Russian. Mrs O. Linsley, 31 Parke Road, Barnes, London SW13. Tel. 01-748 8822.

TECHNICAL TRANSLATIONS from Japanese into English. R. A. Scutt, BA, 48 Somerset Avenue, West Wimbledon, London SW20. Tel. WIMbledon 1713 (01-946 1713).

TECHNICAL OR COMMERCIAL translations into/from English, German, Dutch and French. A. M. H. Speller, FIL, NGV, 6 Lakeside, West Ealing, London, W13 8HN. Tel. 01-998 1045.

AUTHORITATIVE TECHNICAL TRANSLATIONS. Spanish, French, Italian, German, Portuguese, camera copy or printed. E. W. Sykes, FIL, 39 West Close, Wembley, Middlesex, HA9 9PJ. Tel. 01-904 4273.

Advisory services

IRAS: A NEW ADVISORY SERVICE. As much or as little advice and assistance as you need—anything from a half-day's talk to a six-months' assignment. Miss Helen Townley, I.R. Advisory Services, 117 Wickham Chase, West Wickham, Kent, BR4 0BQ. 01-777 7560.

NON-MEMBER'S ADVERTISEMENT

YOUR COMPANY HISTORY—whether book or booklet, commission a full-time professional industrial historian to research and write it. Hugh Barty-King, BA(CANTAB), Holgate House, Ticehurst, Wadhurst Sussex; Tel. Ticehurst (05807) 557.

UNIVERSITY OF EDINBURGH
Department of Urban Design and Regional Planning

PLANNING RESEARCH UNIT

Applications are invited for the post of RESEARCH ASSOCIATE to work on OSTI-financed research project in information for urban and regional planning, to take responsibility for the development and testing of a linked classification and thesaurus to cover the whole field of planning. Practical experience of the construction of both classification schemes and thesauri is necessary, and experience in their application to live situations would be an advantage. An interest also in the broader aspects of information is desirable, as is the ability to come to terms with an expanding multi-disciplinary subject field. The appointment would be for eighteen months to two years, depending on the date of commencement, on the salary scale: £1641 — £3999 per annum. The post may be superannuated.

Applications, by letter (three copies), giving full details of relevant experience and the names of two referees, should be made to the Secretary to the University, Old College, South Bridge, Edinburgh, EH9 9YL. Interviews will be held in London and Edinburgh. Please quote reference 5024.

Assistant Librarian

An Assistant Librarian is required for the Technical Library and Information Services Department within the Brewing and Research Department of Allied Breweries (Production) Limited at Burton-upon-Trent. Duties will include:—

- * Preparing abstracts of journal articles and helping to maintain a subject index of articles and patents.
- * Preparing subject and author indices for literature obtained for the library.
- * Ensuring efficient operation of library loans and journal circulations.
- * Assisting, where possible, in translating foreign correspondence.

Applicants should be graduates in Information Science or Science graduates with an interest in library work. The ability to translate a modern foreign language would be an advantage.

Applications in writing, giving age and full details of experience and qualifications should be submitted to:

The Personnel Officer (Staff), Burton Personnel Department, Allied Breweries (UK) Limited, 126a Station Street, Burton-on-Trent.

Allied Breweries (UK) Limited

University of Rhodesia

DEPUTY LIBRARIAN

Applications are invited for the above-mentioned post. The minimum qualifications are a degree plus qualifications in librarianship and/or information science and extensive administration experience in academic or research libraries.

Salary scale: £3815 × 147 – £4991.

Family passages and allowance for transport of effects on appointment. Installation loan of up to half of one year's salary if required. Provision for study leave. Superannuation and medical aid schemes.

Applications: (6 copies) giving full personal particulars (including full names, place and date of birth, etc.), qualifications, experience and publications, and naming three referees, should be submitted by *12 August 1972* to the Registrar, University of Rhodesia, P.O. Box MP 167, Mount Pleasant, Salisbury, Rhodesia. A further copy to the Association of Commonwealth Universities (Appts), 36 Gordon Square, London WC1H 0PF, from whom further particulars may be obtained.

Mr. Harrison, the Librarian, will be in London during August and the first half of September, to interview shortlisted candidates.

WESTERN AUSTRALIAN INSTITUTE
OF TECHNOLOGY

Department of Library Studies

Applications are invited for appointment at Lecturer/Senior level in the following fields:-

School and Children's Librarianship
Systems Analysis and Data Processing (Library Operations)
Social Context of Librarianship
Physical Bibliography and Special Materials

SALARY: Lecturer – $A6697 – $A9286
Senior Tutor – $A5370 – $A6299

Further particulars and method of application from:-

The Director,
Western Australian Institute of Technology,
Hayman Road,
SOUTH BENTLEY, 6102,
Western Australia.

SCIENTIFIC BOOKS,
LIBRARIES AND COLLECTORS

3rd edition by

John L. Thorton & R. I. J. Tully

Scientific publications and their patrons from before the start of printing to the present. An outstanding 85-page bibliography is complementary to a fine piece of scholarly research.

£7 (£5.60 to L.A. members)

THE LIBRARY ASSOCIATION

LIBRARY BINDING

This has been our trade since the last century, and in practising our craft we have given service to all types of libraries in many corners of the World.

We like to think we still bind books for libraries rather well, apart from our other activities as publishers and booksellers.

CEDRIC CHIVERS LTD

PORTWAY
BATH BA1 3NF

First for carpets
Dodson
Bull

UP TO **30%DISCOUNT**
BRANDED CARPETS

Wilton ● Axminster ● Oriental ● Tufted
● All makes available with full Manufacturers' Guarantees ● NO IMPERFECT GOODS SOLD ● Free delivery in U.K. ● Expert fitting service available most areas.

£200,000 carpets on display
In our extensive London and provincial showrooms
Write stating requirements or for introduction to carpet showrooms in most main cities. Free brochure on request to Dept. ALB

DODSON BULL CARPET CO. LTD
LONDON: 5 & 6, Old Bailey, EC4M 7ID. Tel: 01-248 7971. **BIRMINGHAM:** 164, Edmund St., B3 2HB. Tel: (021)236 5862. **BOURNEMOUTH:** 268, Old Christchurch Rd., BH1 1PH Tel: 21248. **BRISTOL:** 2-3, Royal London House, Queen Charlotte St., BS1 4EX. Tel: 28857. **LEEDS:** 12, Great George St., LS1 3DW Tel: 41451. **MANCHESTER:** 55-61, Lever St., M1 1DE. Tel: (061) 236 3687/8/9. **NEWCASTLE-upon-TYNE:** 90-92, Pilgrim St., NE1 6SG. Tel: 20321/21428. **WESTCLIFF-on-SEA:** 495, London Rd., SS0 9LG. Tel: Southend 46569.
Open: 9.00-5.30 Mon-Fri. Sat. 9.00-12.00
(Manchester 9.00-4.00)

'A Webster is a lovely thing, God wot'

The Guardian

And so are you if you ensure that your Merriam-Webster Dictionaries—particularly *Webster's Third New International* and its famous abridgement, *Webster's Seventh New Collegiate*—are up-to-date editions. Write or phone 01-405 0805.

6 Portugal Street London WC2A 2HL

BELL

A review of the literature on primary communications in science and technology

JACQUELINE HILLS

Aslib Occasional Publication No. 9 *£1.60*

SBN: 85142 039 7

Aslib Publications

British Technology Index

CURRENT SUBJECT GUIDE TO BRITISH TECHNICAL JOURNALS

FOR TRACING AND RECALL

of { specific
recent } information

in the Field of Applied Science, Engineering and Manufacturing Technology

Monthly Parts and Annual Volume

THE LIBRARY ASSOCIATION

7 Ridgmount St. Store St. London, WC1 7AE

(Phone: 01-636 7543)

new books

A Manual of Cataloguing Practice

K G B Bakewell

A comprehensive guide to cataloguing which combines theory and practice, with particular reference to the practices of thirteen representative examples of different kinds of libraries visited by the author.

300 pp £8.00 hard cover

The Administration of Archives

J H Hodson

An introductory survey of the theory and practice of the administration of archives summarizing the author's fifteen years of experience in three types of record repository: county, public library and university.

224 pp £5.50 hard cover

Radio and Line Transmission

Volume 2

D Roddy

Provides a more detailed treatment of topics introduced in the first volume, and deals with more advanced subjects such as Pulse Code Modulation and Field Effect Transistors, keeping mathematics at a bare minimum. These volumes have been specifically written to cover the recommended syllabuses of the C.G.L.I. course for telecommunication technicians. It will also be suitable for electrical technicians specializing in radio communications, and as an introductory course for the senior technician on National Certificate courses.

432 pp £3.25 hard cover £2.40 flexi cover

The Practice of Managerial Psychology

A J DuBrin

Based upon the author's research and practical experience as a consultant, this volume presents a variety of innovative, conceptual schemes to enable the practitioner, student and manager to understand the underlying factors that will determine if and to what degree psychological intervention will be beneficial, meaningless, or harmful to an organization.

326 pp £4.50 hard bound

PERGAMON

23 NOV 197

Published in England by Aslib, 3 Belgrave Square, London SW1X 8PL
Printed by Alden & Mowbray Ltd at the Alden Press, Oxford

CALCUTTA * UNIVER
CENTRAL LIBRARY

Aslib Proceedings

incorporating Aslib Information

SOURCES OF INFORMATION ABOUT THE EEC

INFORMATION SOURCES ABOUT THE EEC IN THE UNITED KINGDOM

1. *Government and official sources of information* RONALD MAYES 501
2. *Commercial and non-Government sources of information* A. L. SMYTH 506
3. *Law and taxation in the EEC and its member countries* W. A. F. P. STEINER 514

INFORMATION SOURCES ABOUT THE EEC IN EUROPE

1. *Market information* IAN MACLEAN 525
2. *Information on European companies* GEORGE P. HENDERSON 532

ASLIB · 3 BELGRAVE SQUARE · LONDON SW1

Aslib Proc. vol. 24 no. 9 pp. 491-544 London, September 1972

RSG

A Gothard Group Company

United States Government
Printing Office

National Technical
Information Service (CFSTI)

United Nations

and all

Foreign Publications

are available in sterling from

Richard S. Gothard & Company Ltd.

(*International Technical, Scientific and Medical Booksellers*)

GOTHARD HOUSE

HENLEY - OXON, RG9 1AJ - ENGLAND

Telephone: 049 12 3602

Aslib Proceedings

incorporating Aslib Information

VOLUME 24 SEPTEMBER 1972 NUMBER 9

© 1972 Aslib and contributors

Aslib Proceedings: incorporating Aslib Information *is published monthly and supplied free to members of Aslib. Subscription rates are £10 annually to non-members, or £2.50 to Aslib members requiring additional copies. Single copies £1, or 25p to members.*

Further information about Aslib's services and membership rates will be supplied on application to the Director, Aslib, 3 Belgrave Square, London SW1X 8PL. Tel. 01-235 5050. Telex 23667; answer-back, Aslib London.

ASLIB CALENDAR 1972

October

FRI.6.	Technical Translation Group meeting. 'BSc Chemistry with German', by A. C. Root (Kingston Polytechnic). Aslib. 3 p.m.
MON.9.	Co-ordinate Indexing Group meeting. Aslib. 3.30 p.m.
WED.18.	Aslib evening meeting: 'Electronic intelligent machines', by Dr Igor Alexsander (University of Kent). Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1. 5 for 5.30 p.m.
	Midlands Branch Junior Workshop: 'Co-operation, materials, systems and staff'. Technical College, Corby, 10 a.m.–4 p.m.
MON.23.	Social Sciences Group evening meeting and lecture by Mr Nuttall (National Institute of Industrial Psychology). Aslib. 5 for 5.30 p.m.
TUE.31.	Transport and Planning Group/LA RSIS one-day conference: 'Sources of information for leisure, recreation and tourism'. Library Association, 7 Ridgmount Street, WC1.

November

MON.13.	Co-ordinate Indexing Group meeting. Aslib. 3.30 p.m.
WED.15.	Midlands Branch one-day conference: 'HMSO—its services and problems associated'. University of Nottingham. 10 a.m.–4 p.m.
THU.16.	One-day joint conference (with Institute of Information Scientists and LA): 'The British Library's service to users'. 7 Ridgmount St, WC1.
FRI.17.	Technical Translation Group meeting, film show and sherry party. Aslib. 4 p.m.
TUE.21.	Aslib one-day study conference: 'Management in a service context'. 36 George Street, Manchester.

	Economic and Business Information Group evening visits (running concurrently): 'The Times' Library, or 'The Financial Times' Library. Printing House Square/Bracken House, EC4.
WED.22.	Aslib evening meeting: 'Summary of projects in hand by Aslib R & D Department'. Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1. 5 for 5.30 p.m.

December

MON.4.	Economic and Business Information/Social Sciences Group joint evening meeting: 'Social statistics', by Mrs M. Nissell (Central Statistical Office). Royal Institution of Naval Architects, 10 Upper Belgrave St, SW1. 5 for 5.30 p.m.
WED.6.	Technical Translation Group meeting. Claude Gill Books, Oxford Street, W1. 5.30 p.m.
MON.11.	Co-ordinate Indexing Group meeting. Aslib. 3.30 p.m.
WED.20.	Aslib Christmas Party. Aslib. 5.30 p.m.

ASLIB INFORMATION

Chairman of Council

Members will wish to congratulate Mr R. C. Wright, Chief Librarian of the Royal Aircraft Establishment, Farnborough, on his election as Chairman of the Council of Aslib for 1972–73. Likewise Mr T. M. Aitchison, Deputy Director of INSPEC, who has been elected Deputy Chairman of the Council.

Mr Wright succeeds Mr F. Liebesny, who served as Chairman from 1970 to 1972.

Midlands Branch visit to RAPRA

Some twenty members of the Aslib Midlands Branch visited the Rubber and Plastics Research Association recently to study the Information Services of the Association and exchange ideas with the information staff. The programme included a film of the information services, a description of the use of a computer for the storage and retrieval of literature abstracts and a tour of the library and printing units.

RAPRA has one of the largest libraries in the world on rubber and plastics. The information services for member companies are based on this library and consist largely of an abstracting service which abstracts from the world's polymer literature and patents, an enquiry service and a publications section which publishes the results of RAPRA work. The main publication is *RAPRA Abstracts*, a weekly journal containing some 25,000 abstracts per year from published polymer literature and British and US patents in the polymer field.

Electronic intelligent machines

The speaker at the Aslib evening meeting on 18th October 1972 will be Dr Igor Aleksander, Chairman, Computers and Cybernetics, of the Electronics

Members of the Aslib Midlands Branch visiting the Information Services of RAPRA

Laboratory at the University of Kent at Canterbury.

Dr Aleksander's research is concerned with machines which, for the first time, exhibit 'intelligent' behaviour at an economical price. They differ considerably from conventional computers, accumulating experience from their environment and scanning it in a manner analogous to human thinking.

Dr Aleksander will describe this machinery and these processes in the simplest non-technical terms possible, with slides and film illustrating his theme.

The meeting will be held in the Weir Hall of the Royal Institution of Naval Architects, 10 Upper Belgrave Street, London SW1X 8PL, beginning at 5.30 p.m. (tea 5 p.m.).

Leisure, recreation and tourism: sources of information

As announced in the June issue of the *Proceedings*, the Aslib Transport and Planning Group and the Research, Special and Information Section of the Library Association are holding a one-day conference on sources of information for leisure, recreation and tourism.

The speakers who have kindly agreed to address the conference have recently been announced. They include Sir Mark Henig, Chairman of the English Tourist Board, who will open the conference; Miss Sylvia Law of the GLC Department of Planning and Transportation, and Mr Peter Davis, Director of the Transport Trust, who will discuss the various documentation problems faced by the researcher; Mr Allan Bell of the UK National Documentation

Centre for Sport, Physical Education and Recreation, Queen's University of Belfast, who will cover leisure with particular reference to sport; Mr David Coleman of the Countryside Commission who will discuss recreation in the countryside; and Miss Gillian Gardner-Smith from the British Tourist Authority, who will survey the sources of information on tourism.

The conference will be held at the Library Association headquarters, 7 Ridgmount Street, London WC1, on Tuesday 31st October 1972. The conference fee will be £6.00 inclusive of morning coffee, lunch and afternoon tea. Further particulars and application forms are available from: Ronald L. McLennan, The Library, Royal Town Planning Institute, 26 Portland Place, London W1N 4BE (Tel.: 01-636 9107 Ext. 11).

Operational research for libraries and information services

In August 1971, Aslib placed a contract with the Institute for Operational Research to explore the scope for using OR in the library and information field. The project formed one of those specially commissioned by OSTI under its current terms of grant to Aslib. A small team from the Institute, led by Dr Martin Elton, explored library and information problems by study of the literature, visits to institutions, discussion with many members of the profession, and analytical work on some key issues.

The Institute prepared a series of working papers for study by the Aslib Research and Development Department, who are now preparing their own report on the outcome of the project.

The study culminated in an all-day discussion meeting arranged by Aslib and OSTI, attended by experts in OR from the British Library Planning Secretariat, The Civil Service Department, the Department of Trade and Industry, Lancaster University Library, the Cambridge Library Management Research Unit, the Open University and elsewhere.

Problems that offer scope for OR have been defined, and it is expected that the operational research approach will figure more prominently in future research and development work undertaken by Aslib and other institutions in the library and information field.

IMEX to visit ten British cities

IMEX, the rail mounted exhibition of information and marketing services, sponsored by Aslib, the Institute of Marketing and the Industrial Marketing Research Association (see June issue of *Proceedings*, p. 313), will tour nine provincial centres throughout Britain, before returning to London. The itinerary is as follows:

2nd–6th October—Nottingham (Platform 2)
9th–13th October—Bristol, Temple Meads (Platform 2)
16th–20th October—Birmingham, Moor Street (Platform 1)
23rd–27th October—Manchester Piccadilly (Platform 12)
30th–3rd November—Liverpool Lime Street (Platform 1)
6th–10th November—Glasgow Central (Platform 11A)
13th–17th November—Newcastle Central (Platform 7)

20th–24th November—Leeds City (Platform 4)
27th–1st December—Sheffield (Platform 1)
4th–8th December—Marylebone (Platform 4)
11th–15th December—Marylebone (Platform 4)

The exhibition will be combined with a series of meetings and courses, including: *Free introductory seminars*, designed to highlight the available information; *Short day courses*, aimed at the busy executive who needs to establish the relevant information that is easily, readily and cheaply available and where it can be obtained; *Full day courses*, which will probe more deeply into specific areas, such as export information, company information (intelligence), desk research, formulating the marketing plan; and *Evening meetings*, to introduce the latest developments in information for marketing, information retrieval and information collection.

The organizers are Imac Research, Lancaster House, More Lane, Esher, Surrey (tel: Esher 63121), from whom further details can be obtained.

Information and library services for Social Services Departments

The changing pattern of social services provision has created new and intensified demands for information and library services. In order to review the needs of these services, consider the existing services and explore future developments, the National Institute for Social Work Training is organizing a one-day conference at the Institute on 'Information and library services for Social Services Departments and other agencies', to be held on Thursday, 30th November 1972, from 10.30 a.m. to 5.30 p.m.

It is hoped that the conference will bring together both potential users and potential suppliers of information and library services. The programme and application form are available from: The Librarian, National Institute for Social Work Training, 5 Tavistock Place, London WC1H 9SS.

The Institute of Information Scientists—Northern Branch

The Northern Branch of the Institute is organizing a three-day course on 'Systems analysis for information workers,' to be held at the University of Manchester, Owens Park, from 17th to 19th April 1973. Further details may be obtained from the Course Organizer, Mr A. G. Woolham, 30 Newhouse Road, Hopwood, Heywood, Lancs.

First World Conference on Informatics in Government

A major conference on a subject of considerable topical interest has been organized by the Intergovernmental Bureau for Informatics, to be held in Florence, Italy, from 16th to 20th October 1972. Entitled 'Informatics in Government', this is the first conference of its kind to draw together representatives from thirty countries throughout the world to discuss the problems and benefits of the application of computers to governmental administration.

Four plenary sessions have been organized, dealing with 'Approaches towards informatics in government administration'; 'Economic and social aspects'; 'Manpower, education, training and impact on society'; and 'Databanks in government, and the aspect of privacy'. A number of smaller, parallel sessions have also been arranged dealing with the use of computers in particular areas of governmental administration.

Speakers from the UK include A. S. Douglas on 'Computers in the United Kingdom Government: a review'; J. C. Hatton on 'The dangers of informatics without standards'; D. W. Moore on 'Informatics manpower planning in government'; and, of particular interest to members, J. Hawgood on 'Benefits and management information for the British Library', and G. B. F. Nibblet on 'Mechanized searching of Acts of Parliament'.

The registration fee is $80.00. Applications should be sent to IBI–ICC Secretariat, 23 Viale Civilita del Lavoro, 00144 Roma, Italy.

Library Advisory Council for England

The following have accepted invitations to serve on the Library Advisory Council for England:

Mr M. Goff	Director, the National Book League.
Mr B. Groombridge	Education Officer, Independent Television Authority.
Councillor D. W. James	Member of Chigwell Urban District Council.
Mr M. B. Line	Librarian, National Central Library.
Mr P. D. Pocklington	City Librarian, Chester.
Councillor T. E. J. Savery	Member of Plymouth City Council.
Mr G. E. Smith	County Librarian, Leicestershire.
Alderman T. Irvine Smith, OBE	Chairman of Surrey County Council.
Mr A. Wilson	Director, Libraries, Art Gallery and Museums, Coventry.

They have taken the places vacated by Mrs W. Bindley, Dr G. Chandler, Mr S. P. L. Filon, Mr F. M. Gardner CBE, Councillor M. G. Harvey, Alderman Colonel P. H. Lloyd CBE, JP, Miss L. V. Paulin OBE, Mr D. T. Richnell and Alderman Mrs M. M. Trotter.

The Drugdoc tape service

The Council of the Library Section of the Royal Society of Medicine has issued an open invitation to a presentation by Messrs. B. T. Stern, R. F. Ashmole and D. E. Smith (Wellcome Foundation Ltd), of a paper on 'The performance of the Drugdoc tape service as a source of preliminary alerts and comparison with other sources, including personal communications', to be held on Monday, 9th October 1972, at 1 Wimpole Street, London W1, beginning at 5.30 p.m. (tea 5 p.m.).

Periodicals received by IEE Library

A list of the periodicals currently received by the Institution of Electrical Engineer's Library giving country of origin and frequency of publication has been compiled. In its present form the list is an unchecked draft and has been produced as an interim version. It is expected that a final, checked version will be available later this year. Copies of the present version are available now from the IEE Library, Savoy Place, London WC2R 0BL.

Library Assistants Workshop

The Library Association Industrial Group and the Hertfordshire Association of Special Libraries are holding a Library Assistants Workshop at the Smith Kline and French Laboratories, Welwyn Garden City, Herts., on Wednesday, 18th October 1972, from 10.15 a.m. to 4.15 p.m. For details and booking form write to: Mrs D. Palmer, Smith Kline and French Laboratories, Mundells, Welwyn Garden City, Hertfordshire.

Usage of periodicals in public libraries

The Department of Education and Science has made a research award of £4,930 to Mr D. E. Davinson, Head of the Department of Librarianship, Leeds Polytechnic for a project entitled 'The usage of periodicals in public libraries'. The objectives of the project are to obtain such information concerning the use of newspapers and periodicals and other serials in public libraries as is necessary and relevant to the determination of rational policies for their acquisition, retention and exploitation. The project is expected to last for twelve months and will involve the employment of a full time research worker.

Request for back numbers of *J. Doc.* and *Aslib Procs.*

We recently received a request from the British Council for out-of-print back numbers of the *Journal of Documentation* and *Aslib Proceedings*, which are required by their Periodicals Department for overseas libraries.

If any member has any spare copies of the following out-of-print numbers, the Periodicals Department will be very grateful to receive them. They should be addressed to: Miss B. C. Turner, Director, Periodicals Department, The British Council, Albion House, 59 New Oxford Street, London WC1A 1BP.

Journal of Documentation

Vol. 16, Nos. 1, 3, 4
Vol. 17, Nos. 2, 3, 4
Vol. 18, Nos. 2, 3, 4
Vol. 19, No. 1
Vol. 23, Nos. 2, 3
Vol. 24, Nos. 2, 3, 4
Vol. 25, Nos. 1, 2, 3
Vol. 26, Nos. 1, 2

Aslib Proceedings

Vol. 13, Nos. 1, 4, 5, 8, 9
Vol. 14, Nos. 8, 10
Vol. 15, Nos. 1–8
Vol. 16, Nos. 9–12
Vol. 17, No. 5
Vol. 18, No. 5
Vol. 19, Nos. 2, 3, 4, 5, 8

BRIEF REVIEWS

CASSELL'S DICTIONARY OF ABBREVIATIONS. Compiled by J. W. Gurnett and C. H. J. Kyte. 2nd edition, revised and enlarged. London: Cassell, 1972. 245 pp. £2.10. (ISBN 0 304 93879 3)

The second revised and enlarged edition of this dictionary maintains the same general scope and format as the first. Predominantly oriented towards Britain and the Commonwealth countries, it includes abbreviations for international organizations, trade and professional bodies, military, ecclesiastical and chivalric terms, and abbreviations that have 'gained some degree of general currency' both nationally and internationally in geographical, commercial, legal, scientific and technical fields.

The 21,000 entries of the original edition have been updated and expanded to 23,000 in the new edition, to include numerous committees and bodies which have appeared during the last five years.

The full names of non-British organizations listed are followed by country of origin, with the exception of international organizations and cases where the country is obvious from the name of the organization. Where abbreviations are for foreign words, English translation is given following the foreign expansion.

This dictionary is not an appropriate source for obscure or foreign abbreviations but it provides a broad coverage of commonly used abbreviations in the English language context.

THE 500 LARGEST COMPANIES IN NORWAY. Oslo: A.S. Okonomisk Literatur, 1971. 153 pp.
THE 500 LARGEST COMPANIES IN SWEDEN. Stockholm: AB Ekonomisk Informationsservice, 1971. 93 pp.
THE 500 LARGEST COMPANIES IN DENMARK. Oslo: A.S. Okonomisk Literatur, 1971. 84 pp.
THE 500 LARGEST COMPANIES IN BELGIUM. Brussels: S.A. Etudes Financières & Economiques, 1970. 71 pp.
Available in Britain from Gower Press, price £5.50 per vol.

All these directories include various tables of the 500 largest industrial organizations in each country, and the ranking of the 100 largest companies by sales, profits, exports and employees. In addition, listings are given of the largest banks, insurance companies and advertising agencies. The tables are clearly laid out and the basic information also includes the place of the head office, the specialization of the company, number of stockholders, assets and invested capital.

The format of each volume is similar. Headings in the tables are in the language of the country and also in English: there is an index to the companies. The Scandinavian directories include special tables on shipping companies, and the Belgian one gives a separate listing of public utilities. The volumes reviewed contain 1970 information, but a note indicates that publication of the 1971 editions is scheduled for Autumn 1972.

INSTITUTE OF PHYSICS. Research fields in Physics at United Kingdom Universities and Polytechnics. London and Bristol: The Institute, 1972. 368 pp. £7.50. (ISBN 0 85498 022 9)

Compiled particularly with research students and their advisers in mind, this publication contains additional and updated information to that listed in the 1st edition, 1970. In particular, this edition includes a number of polytechnics undertaking physics research, these establishments being listed alphabetically after the alphabetical list of universities. Each entry, subdivided by department and then by research field, names the senior staff, indicates the total number of academic personnel and gives a resumé of the research programme. The degrees and diplomas awarded, the bodies awarding scholarships and fellowships, and the name and address of the person to whom enquiries should be addressed are also indicated. The publication has name and subject indexes.

Those contemplating purchase may well question whether this publication contains additional information to that recorded in *Scientific research in British universities and colleges, vol. 1. Physical sciences,* HMSO (1970–71 edition, £6.50). However, the description of the research being undertaken is considerably more detailed in the IP publication, in the majority of cases. The subject index cannot be so favourably compared and greater detail and consistency would facilitate the tracing of relevant information. For example no attempt has been made to differentiate under 'thin film' (twenty-five entries) between those establishments involved in a major or minor way in research in this field, or to indicate the type of film. The coverage of establishments, particularly polytechnics, is not as wide and it is doubtful if the name index is as complete as that of the HMSO publication, although this latter fault is probably due to a failure on the part of certain establishments to name their staff.

Although the usefulness of this publication would be increased by wider coverage and more detailed and consistent indexing, this listing nevertheless contains information which is unlikely to be available elsewhere and therefore should be particularly valuable to research students.

100 CENTRE GUIDE TO COMMERCIAL PROPERTY DEVELOPMENT 1972. Epping (Essex): Gower Economic Publications, 1972. 562 pp. £7.50. (ISBN 7161 0119 X)

The objective of this guide is the presentation of information which will assist organizations wishing to expand or relocate shop and office premises. To this end background commercial data are provided, as well as details of the current property situation and planned future developments. As far as librarians, information officers and market research workers are concerned, the background information may well prove more valuable than the property details themselves.

The publication is divided into three sections, of which Section One is a summary of survey findings, including ranking by office floorspace of the top twenty-five office centres in Great Britain; ranking by retail turnover (1966) of the top twenty-five shopping centres; distribution of office wage levels; distribution of property prices; rail, road and air communications. An analysis of the key regional centres in terms of shopping attraction is included in the

GEP publication *Retail Trade Developments in Great Britain 1971–72*, which was briefly reviewed in *Aslib Proceedings* vol. 24, No. 1, January 1972, p. 9–10.

Section Two contains a regional analysis of opportunities for expansion.

Section Three consists of the 100 centre surveys, and in this section entries are listed in alphabetical order by town, with about four pages devoted to each. Figures are given for the population of the centre and for its hinterland, followed by a brief description of the town. More detailed information is provided under the headings of Shopping, Offices, Communications, Employment, House Prices and Amenities. There is a central area plan giving the main shopping areas (including specific large multiple traders), and a table of new property developments.

At the end of the guide is a directory of names and addresses of agents referred to in the new development tables in the text.

It is stated that the guide will be published annually to allow for the inclusion of the latest statistics. Sources of the statistics presented are indicated in most cases to a varying degree of detail, but dates of the statistics are not always provided. The publication basically presents the results of original survey studies of the 100 centres, but few details of the survey procedure are given.

The guide provides much useful information not hitherto published or in some cases even collected, and as such it is a welcome addition to any commercial reference collection.

STANNETT, A. Bibliography on data co-ordination in the construction industry 1965–1970. London: Department of the Environment, 1972. 39 pp. 50p. *Library Bibliography No. 147.*

The phrase 'data co-ordination' was first used in the context of this bibliography in the title of a 1968 report 'A study of coding and data co-ordination for the construction industry'. This was presented jointly by the Building Research Station (now Building Research Establishment) and the Ministry of Public Building and Works (now part of Department of the Environment) to a sub-committee of the Committee on the Application of Computers in the Construction Industry. Following this report the Ministry established the Working Party on Data Co-ordination to consider the results of a wide programme of research and development. The final report of this Working Party appeared late last year under the more ambitious title 'An information system for the construction industry'. This bibliography demonstrates that the topic has generated much interest on a wide and diffuse front.

The compiler has done a good job in selecting, annotating and arranging 334 references into seven sections headed General; Users and information needs; Classification, thesauri and phraseology; Coding; Project documentation; General documentation; and Management information. The introduction implies an intention to update this bibliography, which should be welcomed as this first edition is already eighteen active months out of date.

Information sources about the EEC in the United Kingdom

1. GOVERNMENT AND OFFICIAL SOURCES OF INFORMATION

Ronald Mayes

Principal Information Officer,
Department of Trade and Industry

Paper presented at an Aslib 'Study Session on Europe: a guide to economic and business information for the EEC', London, 25th April 1972

LET ME BEGIN with a word about the scope of this paper. Although billed as talking about 'Government and official sources' of information I shall not try to be quite so comprehensive. Instead I shall concentrate on describing the types of information provided by the Department of Trade and Industry.

Delegates whose interests come inside the scope of other Government Departments should know that a great deal of help is available from them. Every Department will do its best to answer questions arising from our prospective accession to the Communities or advise on the best sources of information. In some form or other most Departments have published guidance on Britain and the Communities.

(For example, for the farming, fishing and food processing industries the Ministry of Agriculture provides information through its central and regional organization. The Ministry has just started to issue leaflets explaining the implications of the regulations as they will affect farmers, food manufacturers and—later—consumers: one on the egg trade and the EEC has been published so far. Some months ago the Department of the Environment published a study on the construction industries and the EEC. Clearly more guidance material on a wide range of subjects will be necessary over the months and years ahead.)

Nevertheless in this matter the DTI occupies something of a central position:

- the majority of manufacturing and service industries come within our orbit;
- we are responsible for promoting the efficiency of trade and industry overseas as well as at home;
- we are concerned with many aspects of the business environment which will change progressively as a result of membership. Examples are tariffs, many non-tariff barriers to trade and industrial policies generally.

I will describe DTI services in two main blocs. First, the export services—now under the policy control of the British Overseas Trade Board—which operate worldwide but have a very direct importance to firms wanting to increase sales to the Community. Second, other types of service which have been started specifically to ease the path of British firms in the Community.

Export services

Export services are a very considerable organization. Overseas they are based on the commercial departments of British embassies and other posts throughout the world. Besides helping British businessmen in the field abroad this overseas arm provides a large daily flow of information which is channelled mainly to the DTI's Export Services Division, at Export House in the City. This Division is in contact with thousands of British firms and has highly developed techniques for disseminating the right information to them. And throughout the United Kingdom there is a regional organization—based on major cities like Birmingham, Newcastle, Cardiff and Glasgow—whose job is to give on-the-spot help to exporters.

Among the DTI literature provided for this Conference is an article, 'Selling to the Common Market', which says what the export services can do for firms in Community markets. The range covers:

First, *material for desk research on all EEC countries*. Under this heading I include statistics of production, consumption, imports, growth rates and other commercial indicators. Also available for desk research is information on matters like distribution and retail patterns in Europe; brief market assessments for particular products; information on tariffs, VAT, import and other regulations inside the Community; and so on. Second, the services go beyond pure information to provide *highly practical direct help with exporting*. Under this heading I put things like helping to find suitable overseas agents or other representatives; support for firms taking part in group displays at overseas trade fairs and exhibitions; advice on publicity; information about potential importers or the commercial standing of overseas firms; and other matters too numerous to mention.

I think it is worth mentioning that—besides helping firms wanting to make 'visible' exports to Europe—the services will also help manufacturers who feel it will be more profitable to sell know-how. This they will do by introducing British firms to potential licensees in the Community.

Much of the desk research material I have mentioned is avilable from the DTI's Statistics and Market Intelligence Library, also at Export House in the City. If you are not already acquainted with the Library, there is a leaflet available describing its facilities.

Whether you know the Library or not I recommend you to examine its bibliography listing the main sources of statistics on the European Economic Community. This bibliography covers the most useful international publications plus almost comprehensive entries for the various national sources. All these items can be consulted in the Library itself—a fact that shows what an excellent location the Library is for desk research on the EEC of varying degrees of sophistication.

(Firms outside London who cannot always visit the Library may call on its services through their DTI Regional Office. If necessary these offices will also advise on services from local commercial and industrial libraries.)

Before leaving exports I must mention the highly developed service started a few years ago, Computerised Export Intelligence. Very briefly this service utilizes the great amount of commercial information constantly being collected by overseas posts and other agencies. Subscribers—and there are now some 5,300 of them—can select what products or services they want to get intelligence about; what types of market information they need; and what overseas countries they are interested in.

Last year this service issued fifty thousand items of intelligence—of which about ten thousand related to the members of the enlarged Community. These figures include a large number of specific export opportunities in Europe—and a high level of interest of overseas agents in British products: both pointing to the opportunity for increasing our sales to the Community.

A leaflet describing the Computerised Export Intelligence Service has also been distributed to delegates. If your firm is not already a subscriber I suggest you might consider floating the idea of joining as rapidly as possible.

As a final point on the export side, you may like to know of the DTI's Export Marketing Research Scheme. This scheme provides an advisory service on researching export markets; and, in approved cases, help with up to a third of the actual cost of a professional marketing research survey.

So far the majority of surveys commissioned under the scheme have related to EEC countries. If anyone is interested in the scheme leaflets are available which give an idea of its general scope. But the criteria for support were widened last March: if your firm wants to take up the matter seriously I suggest you contact Mr Coram, the DTI's Marketing Research Adviser, at Export House (tel. 01-248 5757 ext. 7263).

Other DTI services

I will now turn to the second main bloc of DTI services relevant to Europe.

Of course membership of the Communities will mean a great deal more than free access to a massive market for exporters. As they stand today most Community regulations are in the agricultural field. But there is already a substantial amount of legislation—on such matters as competition policy, overseas commercial policy, technical standards and rights of establishment—which will affect firms across the country. Again the agreements negotiated for our transition to full Community obligations are complex; but they need to be widely assimilated. Externally, over the next few years, we shall be getting improved access to countries associated with the Community; and there will be changes in EFTA and Commonwealth markets which are not yet known with certainty. Internally of course our own domestic market will be fully opened up to competition from our Community partners

What all this means is that many thousands of firms throughout the United Kingdom need—to a greater or less extent—to rethink their overall strategies. No two firms' opportunities and problems are exactly the same. But all need the easiest possible access to the information and advice necessary for the decision-making process.

In some cases much of the necessary information is to be had from a firm's own resources. A great deal is also available from the non-Government sources to be dealt with by the next speaker. Much of the DTI's own activity is concerned with feeding information to trade associations and other representative bodies for transmission onward to industry.

The way the DTI itself is geared to answer specific queries on the Communities is described in the reprint of articles from our weekly journal *Trade and Industry*. If you look at the last article there you will find lists of DTI contacts responsible for particular industries. There are also contacts for particular DTI subjects—export finance and credit, overseas capital projects, company law, insurance, patents and several others. Firms needing advice or information on EEC problems are welcome to use the contacts listed in the article.

To make sure that the route to DTI advice is the easiest one possible, last July we established the Department's EEC/EFTA Information Unit. Contact this Unit if you want advice about possible sources; if you cannot identify your particular problem in the detailed list; or if your enquiry is fairly general, for example about transitional arrangements.

Even if your enquiry is entirely or partly outside the strictly DTI field, the Unit will do its best to help—for example, by suggesting sources of information in other Government Departments or outside organizations. We recognize that a good many problems do not correspond neatly with Whitehall's own administrative arrangements and that enquirers need help with finding their way around. Some enquiries—particularly on Community publications—are of course batted across to the Community's own information service at Chesham Street, London.

It may be of some interest to say that the EEC/EFTA Information Unit is now handling queries—mainly by telephone—at the rate of over two hundred weekly. In the eight months since the Unit started the total of enquiries handled has risen to over 6,000.

To give a clearer picture of the Unit's activities, perhaps I can quote half a dozen or so of the enquiries made to it last week [mid-April 1972]:

1. An enquiry about the EEC rules of Competition—in particular what is meant by the terms 'negative clearance', 'exception' and 'block exemption'. (This was answered by reference to the DTI Division dealing with competition.)
2. When will the Community's Official Journal become available in English?
3. Where can I get details of the trade agreement between the EEC and Spain—and the documentation necessary for trade transactions?
4. What transitional arrangements will apply to tariffs where there is only a marginal difference between the UK tariff and the CET?
5. A hybrid question bringing in among other points the effects of entry on the UK fishing industry, and the VAT arrangements in the UK and EEC. (On this one contacts were provided in MAFF, Customs and Excise, etc.)
6. On a somewhat less serious level, could we say what flag has been adopted by the EEC?

We have found that calls come to the Unit from all over the United Kingdom and from all kinds of people—executives, company directors, accountants, lecturers and many others, as well as librarians. So far a high proportion has come from large firms and organizations; but a growing number is now coming in from small and medium-sized firms. Needless to say, we particularly welcome queries from firms lacking their own highly developed information resources. On the whole we have found that enquiries are serious—and the level of sophistication is certainly rising all the time.

Last, but certainly not least among DTI services, is our weekly journal *Trade and Industry*. For ten pence a week this contains a great deal of information—on the EEC and many other matters as well.

Most of you probably already know *Trade and Industry*. For any who do not the various reprints which have been distributed to delegates will show the type of articles the journal has been running over the past year. One major series—Britain and the EEC—mainly describes Community policies and institutions which will affect us here in Britain. Another which started last March shows the arrangements which widely different firms in Britain are making to get the best out of the new competitive situation in an enlarged Community. A series starting shortly will concentrate on the Customs and Excise aspects of accession.

Trade and Industry also, of course, publishes vital factual information—including summaries of regulations made by the Community and member Governments. Where possible we also signpost Community regulations in draft.

Overall we see *Trade and Industry* as one of the most useful instruments for disseminating information about Britain and the Communities. We hope to develop the publication's usefulness so that it becomes pretty well essential for every British firm actively trading within the Community.

As you will know, to help firms prepare for entry HMSO published in January 1972 a pre-accession series of English texts of Community secondary legislation in force on 10th November 1971, and which is expected to be still in force on 1st January 1973. The substance of adaptations to individual instruments agreed with the Communities are included in the form of notes, at the end of each instrument; they cover transitional and temporal delay arrangements, and institutional and technical modifications. The series is being supplemented as English translations are made of further Community instruments enacted since 10th November 1971.

The authentic English texts of all this existing secondary legislation—which will be legally binding on us when we accede to the Communities—will be published in an English edition of the Official Journal of the European Communities. Of course from the date of entry English will be one of the official languages of the Communities: all new Community legislation will then be published in English in the Official Journal.

The present HMSO publication is in forty-two parts, of which the last is an index to titles. One of the reprints on display from *Trade and Industry*—the article called 'Secondary Legislation of the European Communities'—provides a guide to non-agricultural legislation contained in the forty-two volumes. I recommend it as a fairly brief introduction to a complicated subject.

Finally, this paper has been something of a catalogue of the various types of assistance. Given the subject, perhaps that was inevitable. However, I hope that I have given a reasonably clear account of what the DTI has on offer; and I hope that as problems crop up many of you will use DTI services in the future.

Information sources about the EEC in the United Kingdom

2. COMMERCIAL AND NON-GOVERNMENT SOURCES OF INFORMATION

A. L. Smyth

Commercial Librarian and Information Officer,
Manchester Public Libraries

Paper presented at an Aslib 'Study session on Europe: a guide to economic and business information for the EEC', London, 25th April 1972

ONE advantage of living in a democratic country is the multiplicity of information sources openly available. Those who believe in a more authoritarian or bureaucratic form of government can point to the economic waste of having so many lines of communication which often overlap, are sometimes even contradictory and, moreover, lack the authority of the state. The business world does not accept this view. It requires great flexibility in its supply of information. It needs to examine a problem from every possible angle and be given the opportunity to select and evaluate information, particularly in that very wide area where it is difficult to distinguish between facts and opinions.

There are many people, not employed by governments, who are producing this information—journalists, financiers, lawyers, marketing and advertising men, firms' representatives and agents. Each is collecting and interpreting facts with his own particular field of interest in mind. The consumer of information has to assess the relevance of each item to his business, its reliability, up-to-dateness and cost and, further, if it is provided in a digestible form.

Experience and expertise can be more important than information. The man who has had to organize container traffic between Manchester and Milan may know far more about certain aspects of international transport than a government official who is an expert on the rules and regulations. Just at present 'regulations', 'directives' and 'decisions' loom very largely on the Common Market horizon and the way to get the best commercial advantage in meeting this new legislation is most important to the businessman. (He knows a good accountant can save him pounds in taxation.) So no matter how excellent government information services may be, there remains considerable scope for non-official sources, particularly those providing advice and assistance.

In this short paper, it is only possible to deal with a few of these sources. By far the best guide is the BNEC's publication *Market Europe: the pathfinders*[1] which is an annotated directory of almost a hundred sources, with an index of four hundred subject headings.

In selecting the sources, I tried to find out where firms turn when they have a business problem. The Bolton Committee has come up with one answer, at least as far as small firms are concerned. Its report[2] quotes the result of a survey in which firms were asked: 'If you need help, to which of the following would you be most likely to turn?' Replies were received from 3,740 firms as follows:

Accountant	1383	Trade Association	485
Solicitor	561	Business consultant	143
Bank manager	543	CBI	129
Chamber of Commerce	496		

The Committee comments: 'the outstanding feature of this table is that the sources most likely to be called upon are localized and familiar. . . . Our other evidence leaves us in no doubt that if a separate category of Government Services had been included it would have come bottom of the poll by a comfortable margin.' (Libraries do no even rate a mention anywhere in the report.)

First of all, let us consider four of the services of potential high use: Banks; Chambers of Commerce; Trade Associations; the Confederation of British Industry.

(1) Banks

Banks have been particularly active in providing information on Europe and some bank publications are among the most useful sources. As an example of the ramifications of a bank's European activities and its international network for collecting information, I should like to describe the comprehensive and highly sophisticated services which just one clearing bank, the Midland, provides. These are, of course, paralleled by the other joint stock banks.

At the local level, the bank manager has personal contact with his customers and, no doubt, their confidence and trust. Behind him is an organization which operates at regional, national and international levels. The Midland has developed close collaboration with selected banks in Europe through the European Banks International Company (EBIC) and the European Advisory Committee (EAC). Its partners in these two organizations include the Deutsche Bank A.G. (1,000 branches), Amsterdam–Rotterdam Bank NV (650 branches), Société Genérale de Banque S.A. (Belgium) (1,000 branches), Société Genérale S.A. (France) (1,000 branches) and Creditanstalt-Bankverein (Austria). There is a link, therefore, between the local bank manager in Tilbury and his colleague in Tilburg.

For medium term finance, borrowing can be arranged in appropriate circumstances through Banque Européenne de Crédit à Moyen Terme (BEC) of which the Midland Bank and Samuel Montague & Co. (an associated company) were founder members. The other members include the banks already mentioned, together with Crédit Lyonnais and Banca Commerciale Italiana. To provide instalment or hire-purchase finance, leasing facilities and factoring, the Midland Bank's subsidiary, Forward Trust, is linked through Exfinter (European Finance International) with Eurolease (Brussels), GEFA (Wuppertal) and MAHUKO (Amsterdam) which are similar finance houses controlled by the European linked banks. The Midland is also a shareholder in the European Enterprises Development Company based in Paris, the purpose of which is to supply risk capital and active managerial assistance for companies developing new projects in Europe.

The Midland has a panel for Overseas Trade Development which consists of officials experienced in international business and economic affairs to help traders with information, assistance and advice on Europe. This includes such matters as ways of establishing a subsidiary company, branch or agency and the tax situation for each method; finding a partner for a joint venture by way of direct investment or licensing agreement; the availability of special investment incentives; marketing aspects of exporting to or importing from the Continent, e.g. best methods of quotation and payment, insurance and EEC requirements as to standards and labelling; information on markets and conditions of trading. Members of the Panel will visit individual manufacturers and even accompany them at important meetings where their expert advice and knowledge may be required.

In addition to the joint stock banks, there are the various merchant banks which again have international connections and can offer a whole range of specialized banking services including all classes of insurance and reinsurance. The European finance houses have their own association, EUROFINAS[3] and recently Euromoney Publications have issued the *Hambro Euromoney Directory*[4] which lists various European financial institutions.

(2) Chambers of Commerce

Chambers of Commerce exist in most towns of any size and their activities vary from those of the smaller chambers, mainly concerned with local trade, to those of the size of Birmingham and London, which have considerable influence and are actively concerned with promoting international trade. There are twenty-six 'focal' chambers in the UK which are responsible for providing a service to all members in their region (e.g. Birmingham is the focal chamber for Dudley, Kidderminster, Tamworth, Walsall and Wolverhampton).

The Association of British Chambers of Commerce is a member of the Permanent Conference of Chambers of Commerce and Industry of the Six. This Permanent Conference consists of the national associations of chambers of commerce in the Common Market countries, together with those of associate countries and countries applying for membership, and its work is carried out by a number of specialist committees. It is consulted by the European Commission in Brussels on proposals relating to trade and industry and thus chambers of commerce not only have early access to information about Common Market business regulations but also are able to comment on and influence pending legislation. The services of the focal chambers are tabulated under more than fifty subject headings in the BNEC's *Market Europe*. These cover customs and excise duties, transport, competition, taxation, marketing, manufacturing, labour, finance and third markets.

One obvious and important aspect of membership of a chamber is the social and personal contacts with other traders and the resulting benefits possible in practical 'know-how'.

As well as local Chambers, there are also the British Chambers of Commerce in the EEC countries and the corresponding foreign Chambers in London.

These can give such useful advice on trading as the reliability of individual companies. Some bi-national chambers publish yearbooks which not only include lists of firms and their agents but also helpful facts on their respective markets.

(3) Trade Associations

Trade Associations and Export Groups serve particular industries or trades and because of their more specific interests can offer a wide variety of services concentrated on one individual industry. They often have contacts with corresponding associations in Common Market countries and through European federations can influence governments and legislation. The many different services provided by Trade Associations are shown in grid form in the BNEC guide. For the industry concerned, these include market research and specialized reports on the markets surveyed, as well as market identification, information on market trends, liaison with main suppliers on matters of price, supply and quality in relation to exports, overseas trade fairs and exhibitions, contacting overseas buyers, standards and advice on export procedures.

Obviously, much of this information is not available outside the trade and services are normally restricted to member companies, although this is not always strictly adhered to. As well as the list of trade associations in the BNEC Guide, there are also the two now indispensable directories, one of British associations and the other of European national associations published by CBD.[5] The latter complements the directory of international organizations issued by the Union of International Associations.[6]

(4) Confederation of British Industry

Whilst trade associations are concerned with specific trades, the CBI's sphere is British industry as a whole. The CBI is an immensely influential body and acts as industry's mouthpiece. Just to take two of its activities in the European field, its Legal Affairs Directorate can provide information on regulations relating to company law and the proposals for a European compnay, whilst its Taxation Department is concerned with the main aspects of tax legislation in the UK and EEC countries. The CBI has published some valuable industrial appraisals of Britain's proposed membership of the community. Other examples of its publications are *Taxation in Western Europe* and *Europe Brief*, a regular newsletter commenting on the effect of European legislation on British industry.

Telephone Information Services

I suppose the kind of information service really required by businessmen is that in which one has only to lift the telephone and say 'Can you tell me . . .?' to get an immediate answer. *The Financial Times* already aspires to such a service based on its library. The FT library is designed to serve a busy daily paper with a fast information retrieval service and this facility has now been extended to outside subscribers for an annual subscription of £100. The Library claims to have a staff of twenty specialists who add at least two thousand news items a day; as well as business information and news, there are also details of more than forty thousand companies throughout the world. Last year, this service was extended to Brussels as the FT/Reuters European Business Service. Subscribers in Belgium are able to ring a confidential number which connects with Reuter's office in Brussels from where it is transmitted to London and the answer telephoned back minutes later.

A longer established and more extensive service is that offered by SVP[7] in France. SVP claims to have 150,000 users, to answer 4,500 questions a day and to provide 1,700,000 consultations a year. This service is based on a library of 60 tonnes of files, 1½ million index cards, 600 periodicals and 3,000 volumes with 260 specialists, 210 telephone lines, telex, 55 offices, 6 departments and 31 services. The effectiveness of a service such as this can be judged from the continuing willingness of its users to pay for the answers they receive.

Libraries

One reason why an enterprise of the scope of SVP would not be a business proposition in this country is because of the information services already provided by public libraries and, in particular, public commercial libraries. As in other aspects of local government, the standard of provision varies from place to place. The stocks of public commercial libraries have been built up according to the day to day demands of their users and, for this reason, each has its own different emphasis reflecting the needs of the local business community.

A public commercial library's services are, to quote the words of the Bolton report, 'localised and familiar'. An independent survey showed that 25 per cent of firms in the Manchester area regularly used the Central Library. The benefits to the businessman of local accessibility are obvious. The library provides him with the facility of being able to browse, say, through the financial accounts of a German company, through a French chemical directory or an Italian fashion journal. He is much less likely to require a specific bibliographical reference than his scientific or technical colleagues but, nevertheless, this browsing can be most advantageous in presenting new ideas or resolving problems as well as in making a selection or evaluation. Members of smaller firms are generally at a disadvantage when using more sophisticated sources, such as financial and statistical material, compared with larger organizations which employ information officers, economists, statisticians and accountants. Even a simple matter like using a foreign telephone directory can floor many people. In these cases, the help of the library staff is most important and, of course, when individual members of the staff are personally known to users there is not the same barrier to consulting them.

In the Manchester Commercial Library, requests for specific factual items of information are received not only from personal callers but also by telephone, telex and letter. The staff have an accumulated experience of dealing with many thousands of inquiries and they can draw on an immediate stock which includes four thousand directories, 1,300 periodicals and a vertical file containing many thousands of clippings and pamphlets, as well as a hinterland collection of a million volumes. About one eighth of the stock refers to Common Market information. By far the most common type of inquiry received concerns companies in one way or another. Speed in providing answers is important as most users prefer 75 per cent of an answer right away rather than 100 per cent in a few days time. There is no direct charge to the user except for photocopying and the use of typewriters. The loan of material outside the premises is kept to a minimum although superseded copies of directories are lent to firms.

This country has reason to be proud of the coverage of scientific and technical publications in national, university and public libraries, but this cannot be said of business publications. Probably no library has more than a third of the current directories published throughout the world and nowhere can one see, for example, all the current German trade directories. The largest number of European company services is taken by the City Business Library, but this is by no means a complete coverage and it would appear that some services are not taken by any British library. Business periodicals are not available as extensively as they should be, particularly those concerned with consumer trades—an area not covered very comprehensively by the NLL.

Publications

In the past, books and pamphlets on the Common Market have tended to be propagandist and repetitive and not particularly useful to the average trader. There are, however, some publications and published services which are of prime importance in providing information. Just four examples of the widely differing types of printed material available will indicate what I mean.

(1) *News services* [8–16]

The pressure of demand for information on Europe has resulted in a number of news services, some dealing with Europe generally and others on more specific aspects, such as finance, employment and EDP. Only a fraction of hard business information is ever published and some of these services hold out the tantalizing prospect of inside information. Others provide much more detailed information on Europe than one could ever expect in a newspaper, and so profuse is the material that the problem for the individual firm is that one has to search through so much chaff in order to obtain any relevant grain. *European Intelligence* is typical of the better kind of service. About half of each weekly number is devoted to European business problems—legislation, trade, production, employment, finance and transport—whilst the other half consists of news items about particular companies. Each issue contains an index of companies and this is cumulated over various periods up to five years.

(2) *Trade marks*

The six Common Market countries were all signatories to the Madrid Arrangement, 1891, covering the international registration of trade marks (Britain did not subscribe). New trade marks are advertised in *Les Marques Internationales*[17] and there is now a computerized index of trade names[18] which covers the period 1949–69; supplements appear every six months and it is proposed to bring the general index up to date every three years. Over half a million entries cover both the actual trade names themselves and in addition the phonetic interpretation of these names in various European languages.

(3) Taxation

The International Bureau of Fiscal Documentation not only publishes the periodical *European Taxation*[19] but also a number of supplementary loose-leaf volumes covering taxation in individual countries, tax treaties and bibliographies of books and periodicals. There is also a series, *Guide to Taxation in Europe*, covering more specific taxes, such as those on patent royalties, dividends, private investment income and interest as well as corporation taxation and value added taxation.

(4) Maps and atlases

Interest in Europe will inevitably lead to a demand for both large scale and specialized maps and atlases not always easily available in this country. Probably the largest stock is held by Zumstein and R-V Verlag, Stuttgart, which has not only maps on many scales but those with special subject coverage such as marketing, land-use, population, geology, mineralogy and climate, together with large collections of town plans and gazetteers. This is backed up by a very efficient service. There is a general loose-leaf catalogue and a list of new maps[20] is issued every four months.

Conclusion

The aim of this paper has been to indicate the variety, multiplicity and complexity of non-government sources which exist either as prime collectors of information or, on the other hand, interpreters of information for particular purposes. New developments are continuously taking place and the information situation is likely to be unstable until at least the time when we are firm members of the Community.

REFERENCES

1 *Market Europe: the pathfinders*, 1971. BNEC Ltd, 21 Tothill Street, SW1.

2 *Report of the Committee of Inquiry on Small Firms*. Cmnd. 4811. London: HMSO.

3 *Eurofinas Newsletter*. European Federation of Finance House Associations (EUROFINAS), Ave. de Tervuren 267, 1150 Brussels.

4 *Hambro Euromoney Directory*. Euromoney Publications Ltd, 14 Finsbury Circus, EC2M 7AB.

5 *Directory of British Associations*; *Directory of European Associations* (pt. 1); *Current European Directories; Statistics Europe; European Companies: a guide to sources of information;* CBD Research Ltd, 154 High Street, Beckenham, Kent.

6 *Year Book of International Organizations*. Union of International Associations, rue aux Laines, 1, 1000 Brussels.

7 SVP, 54 rue de Monceau, 75 Paris, 8.

8 *Business Letter from Europe* (weekly); *European Community Information* (monthly). Financial Times, Bracken House, EC4.

9 *Common Market News Bulletin* (weekly). Common Market News Services, 92 Fleet Street, EC4.

10 *Common Market News Service* (22/year). Compagnie Européenne pour la Développment Industriel et Financier, rue du Commerce 124, 1040, Brussels.

11 *European Intelligence* (weekly). European Intelligence Ltd, Agroup House, 16 Lonsdale Gardens, Tunbridge Wells, Kent.

12 *Europe Daily Bulletin; Europe Documents* (5/month); *Economic Interpenetration*. Europe Informations Internationales S.A., 16 bld. St. Lazare, 1031 Brussels.

13 *Euromonitor Review* (Bi-monthly); *Market Research* (*Gt. Britain*) (monthly); *Market Research* (*Benelux*) (bi-monthly); *Market Research* (*Germany*) (bi-monthly); *Market Research* (*Italy*) (bi-monthly). European Research Consultants Ltd, 125 Pall Mall, SW1.

14 *Euromoney Weekly Report.* Euromoney, 14 Finsbury Circus, EC2M 7AB.

15 *European Executive* (25/year). 13 rue de l'Ancien Port, CH-1211 Geneva, 2.

16 *EDP Europa Report* (24/year). 59 Grays Inn Road, WC1X 8TL.

17 *Les Marques Internationales* (monthly). Organisation Mondiale de la Propriété Intellectuelle (OMPI), 32 Chemin des Colombettes, 1211, Geneva, 20.

18 *Repertoire Alphabetique et Phonetique des Marques Internationales.* Compu-Mark S.P.R.L., Aalmoezenierstraat 68, B-2000 Antwerp.

19 *European Taxation—Supplementary Service* (loose-leaf); *Taxation of Patent Royalties, Dividends, Interest, in Europe* (loose-leaf); *Corporate Taxation in the Common Market* (loose-leaf); *Taxation of Private Investment Income* (loose-leaf); *Value Added Taxation in Europe* (loose-leaf). International Bureau of Fiscal Documentation, 'Minderpoort', 124, Sarphatistraat, Amsterdam-C.

20 *Kartenbrief* (3/year). Geo Center, Zumstein und Reise- und Verkehrsverlag, D7 Stuttgart 80, Postfach 800830.

Information sources about the EEC in the United Kingdom

3. LAW AND TAXATION IN THE EEC AND ITS MEMBER COUNTRIES

W. A. F. P. Steiner

Librarian, University of London Institute of Advanced Legal Studies

Paper presented at an Aslib 'Study session on Europe: a guide to economic and business information for the EEC', London, 25th April, 1972

ALTHOUGH we have become used to talking about the Common Market, it is important to remember that there are three European Communities, namely the European Coal and Steel Community, the European Economic Community (colloquially known as the Common Market) and the European Atomic Energy Community. The precise nature of these Communities is a matter of controversy but it is sufficient to say that each of them is an association of States which have combined for certain purposes by means of a Treaty. Under each of the three treaties the parties enjoy certain rights and have undertaken to perform certain duties. Since the purposes are similar in the three cases and since the parties to the three treaties have so far been the same six countries (Belgium, France, the Federal Republic of Germany, Italy, Luxembourg and the Netherlands) it has been found convenient that the same common organs (the European Parliament, the Council and the Commission of the Communities, and the Court of Justice of the European Communities) should direct, supervise, administer and control the exercise of the rights and performance of the duties arising from the three treaties. This will remain so, although the four candidate countries (Denmark, the Irish Republic, Norway and the United Kingdom) will be members of the European Economic Community and European Atomic Energy Community only. This means that the rights and duties arising from membership of the European Coal and Steel Community will not apply to the candidate countries. In practice, the European Economic Community has overshadowed the other two and in what follows I shall refer to the EEC only. In so far as the law relating to the other two Communities is relevant for my present purpose, it can be found in the same sources as that of the Economic Community.

When talking about the law of the European Economic Community or, for short, Common Market Law, I refer to the rights enjoyed and the duties undertaken by the members of the Community by virtue of their membership. This law will be binding on the United Kingdom and its nationals by virtue of the Treaty of Accession to the Communities, signed on 22nd January 1972 (see ref. no. 1). The law itself is contained partly in the treaties establishing the Communities (nos. 2, 3 and 4), annotated editions of the treaty establishing the European Economic Community can be found in nos. 6, 10, 11, 12, 13, 17 and 76 and partly by legislation enacted under the provisions of the treaties. In addition, certain treaties and agreements have been entered into by the Communities over the years and these will also bind the new members. They can be found in nos. 5 and 6.

In most countries, including the United Kingdom, there are two types of legislation, namely primary legislation which, in the case of the United Kingdom, consists of Acts of Parliament, and secondary legislation, made under powers conferred by primary legislation, in the case of the United Kingdom the statutory instruments. The position in the European Communities is parallel. Primary legislation consists of the treaties establishing them. Secondary legislation is made by virture of the powers conferred by the treaties. It is of various kinds, regulations, directives, decisions, recommendations and opinions. The most important of these are the regulations which are fully binding on the member countries. The other categories of legislation are not binding to the same extent. All the regulations and most of the other instruments are published in no. 7, the official journal of the Communities which is published in the four official languages, Dutch, French, German, and Italian, and will be published in English from 1973. English translations of the regulations have been published for many years by the Foreign and Commonwealth Office (nos. 8 and 19(b)). Secondary legislation in force on 10th November 1971 which is expected to become binding on the candidate countries when the Treaty of Accession comes into force on 1st January 1973 as being still in force at that date, has been published, arranged according to subject (no. 9) and I understand that regulations made now will continue to be published by Her Majesty's Stationery Office. It is obvious that annotated versions will be more useful than the collections of the texts only and these can be found, at least to a certain extent, in nos. 10 and 11.

It is now time to turn from the legal instruments themselves to the literature about them. Some of the relevant works have already been mentioned. The leading English textbook on Common Market law is the work by Campbell (no. 10) which is both a commentary on the Treaty and a textbook. Commentaries in German are nos. 12 and 13, in French nos. 17 and 76. An entirely different work is the *Common Market Reporter* (no. 11). This is a loose leaf work which contains a great deal of background material, the text of the Treaty with commentary, regulations and the judgments of the Court of Justice. It has a number of supplements dealing with specialized topics.

The problems of the candidate countries are examined in nos. 14, 15 and 19(a), and reference may be made in this context to no. 16. Other important works on Community law in general are nos. 17, 18 and 19, the latter being a digest, that is to say, something half way between an index and an abstract.

It is necessary in the case of individual countries to have law courts to enforce the law and to supervise or control the exercise of powers conferred by it; in the same way it has been found necessary to establish a court which has jurisdiction over the organs of the Communities as well as the member countries and their nationals. The Court exists in order to enforce the Community law, that is, to see that it is being obeyed, and to make sure that the organs of the Communities exercise their powers in accordance with Community law. In addition, the courts of law of the member countries have the right to refer to the Court of Justice of the Communities questions of Community law arising in cases pending before them. The decisions of the Court are published in no. 20 which is being published in the four official languages. Just as in the case of the official journal, this collection will be published in English as well from 1973. It will be observed that the volumes of the collection of decisions are numbered from 1954. This is because the same collection covers the predecessor of the present Court, namely the Court of Justice of the European Coal and Steel Community, which was replaced by the present Court in 1958. English translations of the decisions are published in nos. 11, 21 and now 39(a). The *Common Market Law Reports* (no. 21) do not contain all the decisions of the Court of Justice. On the other hand, they contain translations of some important judgments on Community law pronounced by national courts of the member countries. The decisions of the Court from 1954 to 1960 which antedate commencement of no. 21 are collected in Dr Valentine's work (no. 22). A digest of the decisions of the Court can be found in no. 23 which is published in French and in German. The judgments of the Court are also collected in abbreviated form but rather more fully than would be the case in a digest, in no. 25.

As has been mentioned, decisions on points of Community law, are not only rendered by the Court of Justice of the Communities, but also by national courts in the member countries. The more important ones are published in no. 21; digests are contained in nos. 23 and 25 and references can be found in 24 and 26, the latter listing decisions of the Court of Justice itself. Important works about the Court and its work are nos. 22, 27, 28 and 75.

Finally, while dealing with the literature on Community law in general, I should like to list the most important periodicals which specialize on this subject. These are nos. 29, 30, 31, 32, 32(a) and 33, and these are being indexed in the *Index to Foreign Legal Periodicals* (no. 46).

Community law does not cover the whole field of law but only certain topics which are relevant to the purposes for which the Common Market exists. Probably the most important of these is the regulation of competition, or rather the elimination of whatever would impair competition. A number of works have been published on the law relating to competition and anti-trust law. I refer to nos. 34, 35 and 36, all of which are basically the same work. No. 34 is in English and the most up-to-date version. Other works on this topic are 37, 38, 39, 44, 60, 76, 77 (vol. 4), 78, 81 and 92; 37 is the English version of a work originally published in German as part of no. 81. Other topics of importance are the rules relating to the right of establishment (no. 83); the law relating to agriculture (no. 40); the law relating to social security (nos. 41 and 42); company law (no. 45 and 84); and other aspects of commercial law (no. 43).

Before turning to the relevant portions of the legal systems of the member countries I should like to digress for a moment. All the present and future members of the Common Market are signatories of the European Convention on Human Rights. I am neither competent to discuss the question, to what extent the obligations under this Convention might affect Common Market law, and I have neither the time nor the desire to do so, but it is possible that the provisions of the Convention may be relevant and I should therefore like to refer to it very briefly. The Convention has been published as a Command Paper (no. 47). It is important to remember that private individuals may start proceedings before the two organs which have been set up by the Council of Europe in order to enforce the Convention. These are the European Commission of Human Rights and the European Court of Human Rights, both of which sit in Strasbourg. The bulk of the applications is disposed of by the Commission; very few cases go from the Commission to the Court. The decisions of the Court are published by the Court itself (no. 48). The decisions of the Commission are published (no. 49) and issued in mimeographed form (no. 50). Moreover, it sometimes happens that national courts have to apply, or at least to take into consideration, the provisions of the Convention. Decisions in which they do so are published by the Council of Europe (no. 51). Two most important books on the Convention in English are nos. 52 and 53 and there is one specialist periodical (no. 54).

I must now turn to the municipal law of the member countries of the Communities, it being understood that I shall confine myself to the six existing members. First of all, I must refer to works which deal with the law of all, or at least some, of them rather than with the law of one country only. I shall not attempt to cover the whole field of law but only those topics which are relevant from the point of view of membership of the Common Market. Some aspects of municipal law are dealt with in the works already mentioned where appropriate. For information in general see no. 55.

The constitutions of all the countries can be found in no. 56. Judicial review of administrative acts is dealt with in no. 57. Information on cartels, monopolies and all other matters relating to competition can be found in nos. 58, 59, 60, 61, 62, 63, 76, 77, 78, 79, 80, 81, 82, 85 and 92. No. 92 is a collection of the decisions of courts and administrative departments, German and of the Communities, and is published as part of no. 81. Company law is to be found in nos. 64, 65, 76 84. The literature on tax law is voluminous. I refer to nos. 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 74(a), 76, 88. The Library of the Board of Inland Revenue holds the texts of relevant legislation of all countries, and, in many cases, translations into English, and I have been authorized to say that the texts and translations are available to the public. Labour law is to be found in no. 65, also in no. 76; matters affecting trade generally in no. 86, and transport in 87. Industrial property law is dealt with in nos. 76, 89, 90, 92(a) and 92(b); some of the articles in 91 are translations from no. 90.

The titles given for the law of each country are only a small selection; most of them are self-explanatory, and I shall comment only on some of them. No. 106 covers Luxembourg and the Netherlands as well as Belgium; it is an exhaustive discussion of the legal literature of the countries concerned. The same is true of no. 154 for France and Germany, and 185 for Italy. Nos. 114, 153, 170 and 188 are bibliographies, while 186 and 187 are union lists showing the holdings of different libraries. Nos. 93, 107, 130, 131, 132 and 171 are (or in the case of the French titles, contain) current legislation; the two items numbered 94 are very similar and equally useful. Nos. 95, 115, 117, 130, 131, 132 and 173 are general series of law reports. Nos. 155 and 156 are subject arrangements of laws. It will be noticed that several titles are listed for French administrative law, in particular the judicial review of administrative acts. The reason is that the procedure of the Court of Justice of the European Communities follows the French model (i.e. the Conseil d'Etat) some knowledge of which is important for an understanding of the work of the Court. The titles are nos. 136, 137, 138, 139, 140 and 141 (the collection of the decisions of the Conseil d'Etat). 106(b), 154(a), 170(a) and 189 are comprehensive lists of abbreviations 106(a) covering Belgium, Luxembourg and the Netherlands.

REFERENCES

1 *Treaty concerning the accession of the Kingdom of Denmark, Ireland, the Kingdom of Norway and the United Kingdom of Great Britain and Northern Ireland to the European Economic Community and the European Atomic Energy Community (with Final Act) and Decision of the Council of the European Communities concerning the accession of the said States to the European Coal and Steel Community, Brussels, 22 January 1972.* (Misc. 3 (1972).) (Cmnd. 4862.) London: HMSO, 1972.

2 *Treaty establishing the European Coal and Steel Community, Paris, April 18, 1951.* (Misc. 4 (1972).) (Cmnd. 4863.) Also published outside the Command Paper series, both London: HMSO, 1972.

3 *Treaty establishing the European Economic Community, Rome, March 25, 1957.* (Misc. 5 (1972).) (Cmnd. 4864.) Also published outside the Command Paper series, both London: HMSO, 1972.

4 *Treaty establishing the European Atomic Energy Community, Rome, March 25, 1957.* (Misc. 6 (1972).) (Cmnd. 4865.) Also published outside the Command Paper series, both London: HMSO, 1972.

5 *European Communities. Treaties and related instruments.* London: HMSO, 1972. 10 vols.

6 *Codes et lois: traités de l'Europe occidentale et textes d'application,* 1945–. Paris: Editions Techniques. Loose-leaf.

7 COMMUNAUTÉS EUROPÉENNES. *Journal officiel.* Bruxelles: 1958–. (From 1968 in two series: *C. Communications et informations. L. Législation.*)

8 UNITED KINGDOM. Foreign and Commonwealth Office. *European Economic Community regulations,* 1958–8. London: HMSO, 1962–8. (See also 19(b).)

9 EUROPEAN COMMUNITIES. *Secondary legislation.* London: HMSO, 1972. 42 vols.

10 CAMPBELL, A. *Common market law.* London: Longmans, 1969–. 2 vols. with supplement.

11 *Common market reporter.* Chicago: Commerce Clearing House, 1965–. 2 vols (loose-leaf with supplements.)

12 GROEBEN, H.v.d., *and* BOECKH, H.V. *Kommentar zum EWG-Vertrag.* Baden-Baden: Lutzeyer, 1958–60. 2 vols.

13 WOHLFAHRT, E., *and others. Die europaische Wirtschaftsgemeinschaft. Kommentar zum EWG-Vertrag.* Berlin: Vahlen, 1960.

14 BRITISH INSTITUTE OF INTERNATIONAL AND COMPARATIVE LAW IN ASSOCIATION WITH THE GOVERNMENT OF THE IRISH REPUBLIC. *The expansion of the European Community: legal problems of the candidate countries.* London: BIICL, 1971.

15 LANG J. T. *The Common Market and Common law.* Chicago: Univ. of Chicago Press, 1966.

16 WALL, E. H. *Europe: unification and law.* Harmondsworth: Penguin Books, 1969.

17 MÉGRET, J. *and others. Le droit de la CEE.* Bruxelles: Presses Universitaires de Bruxelles, 1970–71. 3 vols.

18 GANSHOF VAN DER MEERSCH, W. J., *ed. Droit des communautés européennes.* Bruxelles: Larcier, 1969.

19 LASSALLE, C. *Répertoire du droit des communautés européennes* (1952–1966). Paris: Librairies Techniques, 1967.

19(a) BATHURST, M. E., *and others, eds. Legal problems of an enlarged European Community.* London: Stevens, 1972.

19(b) EUROPEAN COMMUNITIES. *Official Journal.* Legislation: English translation. London: HMSO, 1969–.

20 COUR DE JUSTICE DES COMMUNAUTÉS EUROPÉENNES. *Recueil de la jurisprudence de la cour.* 1954–. Luxembourg: 1955–.

21 *Common market law reports,* 1962–. Edinburgh: Nelson, 1962–. Restrictive practices supplement, 1966– (loose-leaf).

22 VALENTINE, D. G. *The Court of Justice of the European Communities.* London: Stevens, 1965. 2 vols.

23 EVERSEN, H. *and* SPERL, H., *eds. Répertoire de la jurisprudence relative aux traités instituant les communautés européennes.* 1953–62. Cologne: Heymann, 1965. With annual supplements.

24 COMMUNAUTÉS EUROPÉENNES. Service juridique. *Décisions nationales relatives au droit communautaire: liste sélective de références aux décisions publiées.* Bruxelles: Service juridique des Communautés, 1966–.

25 DÖLLE, H. *and* ZWEIGERT, K., *eds.* Rechtsprechungssammlung zum Europarecht. Tubingen: Mohr, 1966– (loose-leaf).

26 COUR DE JUSTICE DES COMMUNAUTÉS EUROPÉENNES. *Bibliographie de jurisprudence européenne.* Luxembourg: Cour de Justice, 1965–(with supplements).

27 WALL, E. H. The Court of Justice of the European Communities: jurisdiction and procedure. London: Butterworth, 1966.

28 BEBR, G. *Judicial control of the European communities.* London: Stevens, 1962.

29 *Cahiers de droit européen.* Louvain: Nauwelaerts, 1965–.

30 *Common market law review.* London: Stevens, 1963–.

31 *Europa-Recht.* Munchen: Beck, 1966–.

32 *Revue du marché commun.* Paris, 1958–.

32(a) *Revue trimestrielle de droit européen.* Paris: Sirey, 1965–.

33 *Rivista di diritto europeo.* Roma, 1961–.

34 OBERDORFER, C. W., *and others. Common market cartel law.* 2nd ed. Chicago: Commerce Clearing House, 1971.

35 BRAUN, A., *and others. Droit des ententes de le Communauté économique européenne.* Bruxelles: Larcier, 1967.

36 GLEISS, A., *and others. EWG-Kartellrecht. Kommentar.* 2nd ed. Heidelberg: Verlag 'Recht und Wirtschaft', 1965.

37 DERINGER, A. *The competition law of the European Economic Community: a commentary.* Chicago: Commerce Clearing House, 1968.

38 DERINGER, A. *Das Wettbewerbsrecht der europaischen Wirtschaftsgemeinschaft: Kommentar.* Düsseldorf: Verlag 'Handelsblatt', 1962– (loose-leaf).

39 GRAUPNER, R. *The rules of competition in the European Economic Community.* The Hague: Nijhoff, 1965.

39(a) THE TIMES. *European law reports.* London: The Times, 1972–.

40 VENTURA, S. *Principes de droit agraire européen.* Bruxelles: Bruylant, 1967.

41 LYON-CAEN, G. *Droit social européen.* Paris: Dalloz, 1969.

42 RIBAS, J. J. *La politique sociale des communautés européennes.* Paris: Dalloz, 1969.

43 GOLDMAN, B. *Droit commercial européen.* Paris: Dalloz, 1970.

44 GERVEN, W. VAN. *Principes du droit des ententes de la Communauté économique européenne.* Bruxelles: Bruylant, 1966.

45 STEIN, E. *Harmonization of European company laws: national reform and transnational coordination.* Indianapolis: Bobbs-Merrill, 1971.

46 *Index to foreign legal periodicals.* London: Institute of Advanced Legal Studies, 1960–.

47 *Convention for the protection of human rights and fundamental freedoms, Rome, November 4, 1950.* (United Kingdom treaty series No. 71 (1953).) (Cmnd. 8969.) London: HMSO, 1953.

48 EUROPEAN COURT OF HUMAN RIGHTS. Publications. *Series A: Judgments and decisions.* Strasbourg: the Court, 1962–.

49 EUROPEAN CONVENTION ON HUMAN RIGHTS. *Documents and decisions, 1955–57.* The Hague: Nijhoff, 1959; continued as: *Yearbook of the European Convention on Human Rights, 1958–.* The Hague: Nijhoff, 1960–.

50 EUROPEAN COMMISSION OF HUMAN RIGHTS. *Collection of decisions.* Strasbourg: The Commission, 1959– (mimeographed, restricted circulation.).

51 COUNCIL OF EUROPE. Directorate of Human Rights. *Collection of the decisions of national courts referring to the Convention.* Strasbourg: Council of Europe, 1965–.

52 FAWCETT, J. E. S. *The application of the European Convention on Human Rights.* Oxford: Clarendon Press, 1969.

53 MORRISSON, C. C. *The developing European law of human rights.* Leiden: Sijthoff, 1969.

54 *Revue des droits de l'homme: human rights journal.* Paris: Pedone, 1968–.

55 *Bulletin of legal developments.* London: BIICL, 1966–.

56 PEASLEE, A. J. *Constitutions of nations.* 3rd ed. The Hague: Nijhoff, 1965–, vol. 3.

57 AUBY, J. *and* FROMONT, M. *Les recours contre les actes administratifs dans les pays de la Communauté économique européenne.* Paris: Dalloz, 1971.

58 BRITISH INSTITUTE OF INTERNATIONAL AND COMPARATIVE LAW. *Comparative aspects of restrictive trade practices.* (Comparative Law Series, No. 2.) London: BIICL, 1961.

59 THOMPSON, D. C. *Unfair competition: some comparative aspects of the laws of the United States, Germany, France and the United Kingdom.* (Comparative Law Series. No. 12.) London: BIICL, 1966.

60 BRITISH INSTITUTE OF INTERNATIONAL AND COMPARATIVE LAW. *Comparative aspects of anti-trust law in the United States, the United Kingdom and the European Economic Community.* (Comparative Law Series. No. 7.) London: BIICL, 1963.

61 ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT. *Guide to legislation on restrictive business practices.* Paris: OECD, 1960– (loose-leaf).

62 EDWARDS, C. D. *Control of cartels and monopolies: an international comparison.* Dobbs Ferry: NY, Oceana Publications Inc., 1967.

63 THOMPSON, D. C. *Commercial agency and distribution agreements in Europe: law and practice in the Common Market countries and Switzerland.* London: BIICL, 1964.

64 DE HOGHTON, C., *ed. The company: law, structure and reform in eleven countries.* London: Allen & Unwin, 1960 (PEP).

65 *Jura Europae: le droit des pays de la Communauté Economique Européenne.* Munich: Beck, 1964 (loose-leaf). (Droit des sociétés, droit fiscal, droit du travail. 3 vols.)

66 *Bulletin for international fiscal documentation.* Amsterdam: International Bureau of Fiscal Documentation, 1948–.

67 *European Taxation.* Amsterdam: International Bureau of Fiscal Documentation, 1961– (with supplements).

68 INTERNATIONAL BUREAU OF FISCAL DOCUMENTATION. *Guides to European taxation. Vol. 1, The taxation of patent royalties, dividends, interest in Europe.* Amsterdam: the Bureau, 1963– (loose-leaf).

69 INTERNATIONAL BUREAU OF FISCAL DOCUMENTATION. *Guides to European taxation. Vol. 2, Corporate taxation in the Common Market.* Amsterdam: the Bureau, 1964– (loose-leaf).

70 INTERNATIONAL BUREAU OF FISCAL DOCUMENTATION. *Guides to European taxation. Vol. 3, The taxation of private investment income.* Amsterdam: the Bureau, 1967– (loose-leaf).

71 INTERNATIONAL BUREAU OF FISCAL DOCUMENTATION. *Guides to European taxation. Vol. 4, Value added taxation in Europe.* Amsterdam: the Bureau, 1971– (loose-leaf).

72 HARVARD LAW SCHOOL. World Tax Series. *Taxation in Italy.* Chicago: Commerce Clearing House, 1964.

73 HARVARD LAW SCHOOL. World Tax Series. *Taxation in France.* Chicago: Commerce Clearing House, 1966.

74 HARVARD LAW SCHOOL. World Tax Series. *Taxation in the Federal Republic of Germany.* 2nd ed. Chicago: Commerce Clearing House, 1969.

74(a) GREAT BRITAIN. Board of Inland Revenue. *Income taxes outside the United Kingdom.* London: HMSO, 1967–. 8 vols (supplemented by GREAT BRITAIN. Board of Inland Revenue. *Overseas tax developments*).

75 GREEN, A. W. *Political integration by jurisprudence: the work of the Court of Justice of the European Communities in European political integration.* Leiden: Sijthoff, 1969.

76 *Recueils pratiques du droit des affaires dans les pays du Marché commun.* Paris: Editions Jupiter. 49 vols (loose-leaf).

77 BLAKE, H. M. *and* RAHL, J. A., *eds. Business regulation in the Common Market nations.* New York: McGraw-Hill, 1969–70. 4 vols (1. Benelux; 2. France and Italy; 3. Germany; 4. Common Market and American anti-trust: overlap and conflict).

78 CAMPBELL, A. *Restrictive trading agreements in the Common Market.* London: Stevens, 1964.

79 ULMER, E. *ed. Das Recht des unlautern Wettbewerbs in den Mitgliedstaaten der Europäischen Wirtschaftsgemeinschaft.* Köln: Heymann, 1965–68. 5 vols (1. Vergleichende Darstellung mit Vorschlagen zur Rechtsangleichung; 2/1. Belgien, Luxemburg; 2/2. Niederlande; 3. Deutschland; 4. Frankreich; 5. Italien).

80 ULMER, E., *ed. La répression de la concurrence déloyale dans les états membres de la Communauté économique européenne.* Paris: Dalloz, 1967–. 5 vols (Droit comparé avec propositions pour le rapprochement des législations; 2/1. Belgique, Luxembourg; 2/2. Pays-Bas; 3. Allemagne; 4. France; 5. Italie).

81 *Wirtschaft und Wettbewerb.* Düsseldorf: Verlag 'Handelsblatt', 1951–.

82 *Sociaal economische wetgeving.* Zwolle: Tjeenk Willink, 1953–.

83 EVERLING, U. *The right of establishment in the Common Market.* Chicago: Commerce Clearing House, 1964.

84 PENNINGTON, R. R. *Companies in the Common Market*; 2nd ed. London: Oyez Publications, 1970.

85 *Aussenwirtschaftsdienst des Betriebsberaters: Recht der internationalen Wirtschaft.* Heidelberg: Verlag 'Recht und Wirtschaft', 1955–.

86 *Journal of world trade law.* London: Vincent Press, 1967–.

87 *European transport law.* Louvain, 1966–.

88 FISCALITÉ DU MARCHÉ COMMUN: *Europaische Steuerzeitung.* Deventer: Kluwer, 1953–.

89 *Gewerblicher Rechtsschutz und Urheberrecht.* Weinheim: Verlag 'Chemie', 1896–.

90 *Gewerblicher Rechtsschutz und Urheberrecht. Internationaler Teil.* Weinheim: Verlag 'Chemie', 1954–.

91 *International review of industrial property and copyright law.* Munich: Max-Planck-Institute for Foreign and International Patent, Copyright and Competition Law, 1970–.

92 *Wirtschaft und Wettbewerb- Entscheidungssammlung zum Kartellrecht.* Düsseldorf: Verlag 'Handelsblatt', 1951–.

92(a) ALEXANDER, W. *Brevets d'invention et règles de concurrence du traité* CEE. Bruxelles: Bruylant, 1971.

92(b) BUNNEN, L. VAN. *Aspects actuels du droit des marques dans le Marché commun.* Centre Inter-Universitaire de Droit Comparé, 1967.

Belgium

93 *Pasinomie belge.* Bruxelles: Bruylant, 1788–.

94 *Les codes Larcier.* Bruxelles: Larcier, 1970–. 5 vols (with supplements).

94 SERVAES, J. *and* MECHELYNCK, E. *eds. Les codes et les lois spéciales les plus usuelles en vigueur ...* Bruxelles: Bruylant, 1970–. 5 vols (with supplements).

95 *Pasicrisie belge.* Bruxelles: Bruylant, 1814–.

96 DEKKERS, R. *Précis de droit civil belge.* Bruxelles: Bruylant, 1954–5. 3 vols (with supplement).

97 PAGE, H. DE. *Traité élémentaire de droit civil belge.* Bruxelles: Bruylant, 1940–. 16 vols.

98 FRÉDÉRICQ, L. *Traité de droit commercial belge.* Gand: Fecheyr, 1946–55. 10 vols.

99 RIJN, J. VAN, *and* HEENEN, J. *Principes de droit commercial.* Bruxelles: Bruylant, 1954–66. 5 vols.

100 HORION, P. *Notions de droit industriel belge.* Liège: Faculté de Droit, 1967.

101 BAUDHUIN, F. *Précis de finances publiques.* Bruxelles: Bruylant, 1966–8. 2 vols.

102 TIBERGHIEN, A. *Manuel de droit fiscal.* Bruxelles: Institut Fiscal et Financier, 1967.

103 COLENS, A. Le contrat d'emploi. Bruxelles: Larcier, 1967.

104 HORION, P. Nouveau précis de droit social belge. Liège: Faculté de Droit, 1969.

105 DENIS, P. *Droit de la sécurité sociale.* Bruxelles: Larcier, 1970.
106 GRAULICH, P., *and others. Guide to foreign legal materials: Belgium, Luxembourg, Netherlands.* (Columbia University in the City of New York. Parker School of Foreign and Comparative Law). Dobbs Ferry (NY): Oceana Publications, 1968.
106(a) CAMBIER, C. *Droit administratif.* Bruxelles: Larcier, 1968.
106(b) SPRUDZS, A. Benelux abbreviations and symbols: law and related subjects. Dobbs Ferry, (NY): Oceana Publications, 1971.

Luxembourg

107 *Pasinomie luxembourgeoise.* Luxembourg, 1830–.
108 *Code civil et code de procédure civile en vigueur dans le Grand-Duché de Luxembourg.* Bourg: Bourger, 1967– (with supplement).
109 *Code de la législation commerciale.* Bourg: Bourger, 1966– (with supplement).
110 *Code fiscal luxembourgeois.* Luxembourg: Peiffer, 1961– (with supplement).
111 *Le droit du travail au Grand-Duché de Luxembourg: recueil des lois, arrêtés et règlements.* Luxembourg, Solist, 1967– (with supplement).
112 PEMMERS, T. *Le contrat de travail des employés dans le Grand-Duché de Luxembourg.* Bourg: Bourger, 1953.
113 LUXEMBOURG. Ministère du Travail et de la Sécurité Sociale. *La sécurité sociale: lois et règlements.* Luxembourg: le Ministère, 1967.
114 INTERNATIONAL ASSOCIATION OF LEGAL SCIENCE. National Committee of Luxembourg. *Bibliographie du droit luxembourgeois.* Bruxelles: Larcier, 1927.
115 *Pasicrisie luxembourgeoise.* Luxembourg: Beffort, 1881–.

Netherlands

116 FRUIN, J. A., *comp. De Nederlandsche wetboeken.* The Hague: Nijhoff (frequently re-edited).
117 *Nederlandse Jurisprudentie.* Zwolle: Tjeenk Willink, 1913–.
118 POELJE, G. A. VAN. *Inleiding tot het bestuursrecht.* Alphen an den Rijn: Samsom, 1968.
119 ASSER, C. *Handleiding tot beoefening van het nederlands burgerlijk recht.* Zwolle: Tjeenk Willink, 1934–67. 10 vols.
120 PITLO, A. *Commentaar op het nederlands burgerlijk wetboek.* Zwolle: Tjeenk Willink, 1955–68. 4 vols.
121 MOLENGRAAF, W. L. P. A. Leidraad bij de beoefening van het nederlands handelsrecht. Haarlem: Bohn, 1953–62. 5 vols.
122 DORHOUT MEES, T. J. *Kort begrip van het nederlandse handelsrecht.* Haarlem: Bohn, 1964.
123 MULDER, A., *and* MOK, M. R. *Kartelrecht.* Alphen an den Rijn: Samsom, 1962.
124 DRUCKER, W. H., *and* BODENHAUSEN, G. H. C. *Kort begrip van het recht betreffende de industriele en intellectuele eigendom.* Zwolle: Tjeenk Willink, 1966.
125 ADRIANI, P. J. A., *and* HOORN, J. VAN. *Het belastingrecht.* Amsterdam: Veen, 1954–5. 3 vols.
126 HOFSTRA, H. J. *Inleiding tot het nederlandse belastingrecht.* Deventer: Kluwer, 1970.
127 MOLENAAR, A. N. *Arbeidsrecht.* Zwolle: Tjeenk Willink, 1953–8. 3 vols.
128 WINDMULLER, J. P. *Labor relations in the Netherlands.* Ithaca (NY): Cornell UP, 1969.
129 GUASCO, DE, *and others. Het sociaal verzekeringsrecht in Nederland.* Alphen an den Rijn: Samsom, 1971.

France

130 *Recueil Dalloz.* Paris: Dalloz, 1845–1964.
131 *Recueil Sirey.* Paris: Sirey, 1789–1964.
132 *Recueil Dalloz–Sirey.* Paris: Dalloz, Sirey, 1965–.
133 *Petits codes Dalloz.* Paris: Dalloz, re-edited every one, two or three years. In particular: *code civil, code de commerce, code des sociétés, code du travail, code des impôts, code de sécurité sociale.*
134 AMOS, M. S., *and* WALTON, F. P. *Introduction to French law.* 3rd ed. Oxford: Clarendon Press, 1967.
135 *Nouveau répertoire de droit.* 2nd ed. Paris: Dalloz, 1962–. 4 vols (with supplements).

136 BROWN, L. N., *and* GARNER, J. F. *French administrative law*. London: Butterworth, 1967.
137 LAUBADÈRE, A. DE. *Traité élémentaire de droit administratif*. 5th ed. Paris: Librairie Générale de Droit et de Jurisprudence, 1970. 3 vols.
138 WALINE, M. *Droit administratif*. 9th ed. Paris: Sirey, 1963.
139 AUBY, J. M., *and* DRAGO, R. *Traité de contentieux administratif*. Paris: Librairie Générale, 1962. 3 vols.
140 HAMSON, C. J. *Executive discretion and judicial control: an aspect of the French Conseil d'Etat*. (Hamlyn Lectures. 6th series.) London: Stevens, 1954.
141 *Recueil des décisions du Conseil d'Etat* (*Recueil Lebon*). Paris: Sirey, 1821–.
142 MARTY, G., *and* RAYNAUD, P. *Droit civil*. 2nd ed. Paris: Sirey, 1962–. Several volumes.
143 MAZEAUD, H., *and others*. 4th ed. *Leçons de droit civil*. Paris: Editions Montchrestien, 1963–. Several vols.
144 RIPERT, G., *and* BOULANGER, J. *Traité de droit civil*. Paris: Librairie Générale, 1956–9. 4 vols.
145 RIPERT, G. *Traité élémentaire de droit commercial*. 6th ed. Paris: Librairie Générale, 1968–70. 2 vols.
146 DEVANT, P., *and others*. *Les brevets d'invention*. Paris: Dalloz, 1971.
147 ROUBIER P. *Le droit de la propriété industrielle*. Paris: Sirey, 1952. 2 vols.
148 *Jurisclasseur commercial. Annexes: Concurrence déloyale, appellations d'origine, indications de provenance; brevet d'inventions; marques et dessins*. Paris: Editions Techniques, 1963– (loose-leaf). Several vols.
149 GAUDEMET P. *Précis de finances publiques*. Paris: Editions Montchrestien, 1970. 2 vols.
150 TROTABAS, L., *and* COTTERET, L. *Finances publiques*. 4th ed. Paris: Dalloz, 1970.
151 CAMERLYNCK, G., *ed*. *Traité du droit du travail*. Paris: Dalloz, 1966–70. 8 vols.
152 DUPEYROUX, J. J. *Droit de la sécurité sociale*. 4th ed. Paris: Dalloz.
153 DAVID, R., *comp*. *Bibliographie du droit français*, 1945–60. Paris: Mouton, 1964.
154 SZLADITS, C. *Guide to foreign legal materials: French, German, Swiss*. (Columbia University in the City of New York. Parker School of Foreign and Comparative Law.) Dobbs Ferry (NY): Oceana Publications, 1959.
154(a) SPRUDZS, A. *Foreign Law abbreviations: French*. Dobbs Ferry (NY): Oceana Publications, 1967.

Germany

155 SCHÖNFELDER, H., *ed*. *Deutsche Gesetze*. 30th ed., München: Beck (loose-leaf).
156 SARTORIUS, C., *ed*. *Verfassungs- und Verwaltungsgesetze*. 21st ed., München: Beck (loose-leaf), 2 vols (1. Germany; 2. Europe).
157 *Entscheidungen des Bundesgerichtshofes in Zivilsachen*. Koln: Heymann, 1951–.
158 COHN, E. J., *and others*. *Manual of German Law*: 2nd ed., London: BIICL, 1968–71. 2 vols:
159 ENNECCERUS, L., *and others*. *Lehrbuch des bürgerlichen Rechts*; various eds., Tubingen. Mohr, 1952–. 5 vols.
160 PALANDT, G *ed*. *Bürgerliches Gesetzbuch*. 30th ed. München: Beck, 1971 (frequently re-edited).
161 BAUMBACH, A., *and* DUDEN, K. *Handelsgesetzbuch*. 19th ed. München: Beck, 1971.
162 KRAUSSE, H., *and others*. *Das Patentgesetz*. 5th ed. Koln: Heymann, 1970.
163 MUELLER, R., *tr*. *GmbH: the German law concerning the companies with limited liability*. Frankfurt: Knapp, 1967.
164 MUELLER, R., *and* GALBRAITH, E. G., *trs*. Aktiengesetz 1965: the German stock corporation law. Frankfurt: Knapp, 1966.
165 MUELLER-HENNEBERG, H., *and* SCHWARTZ, G. *Gesetz gegen Wettewerbsbeschränkungen und europaisches Kartellrecht*; 2nd ed. Koln: Heymann, 1963.
166 BAUMBACH, A., *and* HEFERMEHL, W. *Wettbewerbs- und Warenzeichenrecht*; 10th ed. München: Beck, 1969–71. 2 vols.
167 BUEHLER, O., *and* STRICKRODT, G. *Steuerrecht*; 3rd ed. Wiesbaden: Gabler, 1960. 2 vols.
168 HUECK, A., *and* NIPPERDEY, H. C. *Lehrbuch des Arbeitsrechts*. Berlin: Vahlen, 1963–70. 2 vols. in 3.
169 BRACKMANN, K. *Handbuch der Sozialversicherung*. Bad Godesberg: Asgard Verlag, 3 vols. (loose-leaf).

170 BAUR, F., *and* PETERSON, C. H., *comps. Bibliographie des deutschen Rechts in englischer und deutscher Sprache*; Stand: 31.12.1963. Karlsruhe: Müller, 1964 (with supplement 1964–68, 1969).
170(a) KIRCHNER, A. *Abkürzungsverzeichnis der Rechtssprache*; 2nd ed. Berlin: de Gruyter, 1968.

Italy

171 LEX—*Legislazione italiana.* Torino: UTET, 1915–.
172 *Cinque codici.* Milano: Giuffrè. Frequently re-edited.
173 *Giurisprudenza italiana.* Torino: UTET, 1849–.
174 CAPPELLETTI, M. *The Italian legal system.* Stanford: Stanford UP, 1967.
175 *The Italian civil code*; tr. by J. M. Merryman. Dobbs Ferry (NY): Oceana Publications, 1969.
176 MESSINEO, F. *Manuale di diritto civile e commerciale.* Milano: Giuffrè, 1952–65. 6 vols.
177 TRABUCCHI, A. *Istituzioni di diritto civile*; 18th ed. Padova: CEDAM, 1971.
178 ASCARELLI, T. *Corso di diritto commerciale*; 3rd ed. Milano: Giuffrè, 1962.
179 *The Italian law of companies, labour, enterprise and economic organisation: the Italian civil code*; ed. by V. G. Venturini. Deventer: Kluwer, 1967.
180 ASCARELLI, T. *Teoria della concorrenza e dei beni immateriali*; 3rd ed. Milano: Giuffrè, 1960.
181 ROTONDI, M. *Diritto industriale*; 5th ed. Padova: CEDAM, 1965.
182 MICHELI, G. A. *Corso di diritto tributario.* Torino: UTET, 1970.
183 RIVA SANSEVERINO, L., *and* MAZZONI, G. *Nuovo trattato di diritto del lavoro.* Padova: CEDAM, 1971. 3 vols (incl. social insurance).
184 LEVI SANDRI, L. R. *Istituzioni di legislazione sociale*; 10th ed. Milano: Giuffrè, 1971.
185 GRISOLI, A. *Guide to foreign legal materials: Italian.* (Columbia University in the City of New York. Parker School of Foreign and Comparative Law). Dobbs Ferry (NY): Oceana Publications, 1965.
186 *Union List of West European legal literature.* London: Institute of Advanced Legal Studies, 1966.
187 *Union list of legal periodicals*; 3rd ed. London: IALS, 1968.
188 *Bibliography of translations of codes of private law in member states of the Council of Europe and the Hague Conference on Private International Law.* Strasbourg: Council of Europe, 1967.
189 SPRUDZS, A. *Italian abbreviations and symbols: law and related subjects.* Dobbs Ferry (NY): Oceana Publications, 1969.

Information sources about the EEC in Europe

1. MARKET INFORMATION

Ian Maclean

Director, IMAC Research

Paper presented at an Aslib 'Study session on Europe: a guide to economic and business information for the EEC', London, 25th April 1972

REVIEWING sources of information in the EEC in a short paper requires a certain facility for avoiding the very problems that cause the most difficulty in practice. This paper can only, therefore, be considered as a guide to the guides of sources of marketing information in the EEC. In finding one's way through the 'information maze' to the precise data one is seeking it is helpful to consider the outline of data collection in Europe. The principal sources of information are:

Government
Semi-official organizations
Trade Associations
Banks
Professional Societies
Newspapers and Journals
Commercially produced reports.

Of these sources the most useful are Government ones, so one should examine carefully the structure of the government collection mechanism. The basic pattern is that statistics will be collected by:

A Central Bureau of Statistics
Individual Ministries
A Planning Commission

The relevant guides and references for each country are given in the Appendix.

In interpreting government information and to ensure that your search is fully effective it is essential to develop an understanding of how the data collection system works. Fortunately, for our sanity the basic pattern is similar throughout Europe. References for the four points set out below are also in the Appendix:

(1) You will find books and articles on the methodology of the system.
(2) In several countries guides have been published. The German guide in particular is essential reading (and there is an English version). The

German information system is legal! Like the American constitution it was devised and written down at one time and enshrined in law in 1948. This is in stark contrast to the pattern of other countries where the collection of information has grown up piecemeal.

(3) Information collection requires a classification system for products and industries. Attempts are being made to develop a uniform classification system in the EEC but it will be many years before it is achieved. All we have to date is conformity on broad headings, e.g. electric lighting, but when we go down to the different types of lighting the classifications diverge.

(4) Catalogues of the publications of each government are readily available.

Some comments on individual countries

The following notes are only intended as highlights. Belgium and Holland are small countries; in many sectors therefore the market will be dominated by one or two companies, so that no information can be made available. The advantage of a small country, however, is that the collection of statistics is easier, and Holland has a very fine central collection system, geared to a particularly effective Government planning mechanism.

In France, INSEE dominates the scene, but the French *plan*, now in its sixth edition, also generates a substantial body of useful information. The trade associations are active in the collection of statistics and are closely linked into the *plan*. Everything is centred on Paris.

In Germany the responsibility for statistics is with the Federal Statistical Office and not with each Ministry. The collection, however, is devolved to the statistical offices of the various Lande, so that for the full details it may be necessary to visit each Lande.

In Italy the Institute of Statistics in Rome, a non-Governmental body, is the main source. The Banks in Italy are of particular value, notably the Bank of Sicily and the Bank of Rome, both of which produce important reviews on market sectors.

Conclusion

The information problem is not so much a lack of information, as a lack of knowledge of how to set about finding a specific item. If you can develop an understanding of the 'system' you will be pleasantly surprised at just how much information is available. In this context, marketing information has been very badly served. The main developments have been directed towards scientific and technical information, so that all one can offer you in your search is blood, sweat and tears—some references—but, for the main part, you are on your own.

APPENDIX

Given the wide geographic coverage the following references concentrate on one information sector—industrial market information. The other exclusions are:

- No attempt has been made to cover supranational and international organizations. These are, of course, of the greatest importance as a source of information about individual countries.
- Imports and exports have not been covered as the pattern is virtually common to all EEC countries.
- Reference should also be made to the Overseas Business Reports of the US Bureau of International Commerce.

One major work of reference not mentioned below is *Statistics Europe*, published by CBD Research Ltd. The only reason for this omission is that it would have been mentioned so frequently; in fact, this publication is so comprehensive that it makes this paper almost unnecessary. Two other CBD publications were also used—*Current European Directories* and *Directory of European Associations*.

Valuable assistance in the preparation of this list of references was also given by: Mr Frank Cochrane, Librarian at the Export Services Library, Hillgate House, London; Mr Raoul Laffy, Director General of SEMA, Paris; Mr H. A. P. van Zutphen, Van Gelder Papier, Amsterdam; Dr-Ing G. Franzen, Infratest-Industria, Munich; Mr Derek Riley, Eurofinance, Paris; Dr Roberto Woynar, Monticatini, Milan.

BELGIUM

1. Basic sources

1.1. *Institut Nationale de Statistique (INS)*, 44 rue de Louvain, 1000 Brussels. A catalogue is issued which includes all past publications. Updated with monthly supplements.

1.2. *Conseil Centrale de l'Economie*, 17–21 ave de la Joyeuse Entrée, 1040 Brussels. The Central Economic Council publishes a guide to statistics (Inventaire des Statistiques) divided into eleven sections. Section F deals with industrial statistics. Each section is further sub-divided and information is given concerning the reasons for collecting all types of statistics, the frequency with which they are collected, the organization collecting the information, the organization dealing with the information, publications in in which the information appears, and the period of delay before publication.

1.3. *Ministry of Economic Affairs*, 6 rue de l'Industrie, 1000 Brussels 4.

1.4. *Banque Nationale de Belgique*, blvd de Berlaimont 5, 1000 Brussels. Publishes a monthly information bulletin which includes production statistics.

1.5. *Centre National de Documentation Scientifique et Technique*, Kaizerslaan 4, Brussels 1. Publishes a directory of Belgian research libraries and documentation centres.

1.6. There is a directory of Ministries—*Guide des Ministères*, published by Revue de l'Administration Belge, 64 ave de l'Opale, Brussels 4.

2. Publications

2.1. *Annuaire statistique* and its companion monthly bulletin—issued by INS (of 1.1.). Covers all statistics.

2.2. *Basic statistics*—published by Institut Belge d'Information et de Documentation, 3 rue Montoyer, Brussels 4. The statistics are on the sector level and review a five year period 1965–9.

2.3. *Statistiques Annuelles de la Production*—INS. Detailed information on twenty industries. Monthly figures of production, sales, stocks, etc. Separate industry reports are available for annual statistics.

2.4. *Recensement de l'industrie et commerce* (INS). This is the major industrial census showing size of companies, regions, etc., but the last census was for 1961.

2.5. *Guide to Belgian Market 1969*. Belgian Foreign Trade Office, 4 Galerie Raverstein, Brussels 1 (191 pages)—also available from Belgian Embassy, 103 Eaton Square, SW1.

2.6. *Economic Report on Belgium 1968.* Lloyds Bank, 6 Eastcheap, EC3.
2.7. *Basic Facts about Belgium.* Ministry of Foreign Affairs, Brussels (available free from Belgian Chamber of Commerce in UK, 6 Belgrave Square, SW1).

FRANCE

1. Basic sources

1.1. *L'INSEE* (*Institut National de la Statistique et des Etudes Economiques*) has its headquarters at 29 Quai Branly, Paris 7, and eighteen regional offices. L'INSEE is a central organization responsible for:

1. Collecting social and economic information.
2. Carrying out surveys and other studies.
3. Publishing and disseminating information.

Guides to the products and industries for which statistics are available include *Repertoire des Sources Statistiques Françaises* and *Nomenclature des activités économiques.* L'INSEE issues a catalogue of its publications, which also describes its work.

1.2. *Service Central de la Statistique et des Informations Industrielles* (*SCSII*) (Central Service of Industrial Statistics and Information), 85 blvd du Montparnasse, Paris 6. A department of the Ministry for Industry. Collects and publishes statistics of industrial production.

1.3. *Government departments* are listed and described in a directory, *Bottin Administrativ,* published by Ste Didot—Bottin, 1 rue Sebastian Bottin, Paris 7.

1.4. *The Commissariat General au Plan* is equivalent to NEDO in that it brings together the representatives of industry and of the Government. The *plan* is built up on a sector and industry basis and the 6th *plan* is now in operation from 1971–5. A list of studies carried out by the Commission is published. While the Commission tends to deal with broad economic developments, the committees produce detailed industry reports, e.g. motor cars, textiles, furniture.

1.5. *Centre National d'Information pour la Productivité des Entreprises* (*CNIPE*), Tour Europe, 92, Courbevoie.

1.6. *L'Ecole Nationale de la Statistique et de l'Administration Economique* (*ENSAE*). Works closely with INSEE.

1.7. *Trade Associations.* A very important source of information collection, in close collaboration with the INSEE and the *Plan.* In many sectors statistics are collected by the trade association on behalf of the INSEE. A list of Trade Associations is published by the *CNPF* (*Conseil National du Patronat Français*), 31 ave Pierre 1er de Serbie, Paris 16.

2. Publications (Statistics)

2.1. *Annuaire statistique* (INSEE cf. 1.1).
2.2. *Bulletin mensuel de statistique* (INSEE).
2.3. *Annuaire de statistique industriel* and a monthly equivalent (*SCSII* cf 1.2).
2.4. *Recensement de l'industrie* (*Census of Industry*) INSEE. Similar to UK Census—firms and establishments by size and region for each industry sector etc. Last census year was 1963, the next will be 1974. INSEE, however, also produces a mini census for intermediate years—the last being for 1966.
2.5. *Les structures industrielles françaises* (*SCSII* cf 1.2). Results of studies into the structure of particular industries; fifteen have been completed to date.

GERMANY

1. Basic sources

1.1. *Federal Statistical Office—Statistisch Bundesamt, Wiesbaden.* (*FSO*). The collection of statistics is centralized. Each competent federal ministry having decided what statistics are required then passes over their collection to the Federal Statistical Office, which in turn hands over the actual collection to the statistics offices of the Federal States of Germany. These statistics are then summarized and published at the FSO.

1.2. *Das Arbeitsgebiet der Bundesstatistik* (*Survey of German Federal Statistics*) published by FSO. A massive document which describes the legal framework, methodology, systems of classification, range of statistics and publications, Abridged versions are available in English and in French. This survey is ***essential reading for anyone investigating the German market.***

1.3. *Kennziffern der Veröffentlichungen des Statistischen Bundesamtes*—a guide to the government statistics listing all types of statistics collected.

1.4. *Systematisches Warenverzeichnis fur die Industriestatistik*—the standard industrial classification for production statistics. This is only one of the large number of classifications listed in the survey (cf. 1.1). An important feature of the classification systems is that they discuss the build-up or breakdown of the system. There is in fact a six digit code in the Commodity Classification for Industry Statistics (1970 edition) which lists 5,445 types of commodity. An alphabetical list for industry statistics is available, and of the greatest interest is a special booklet *Confrontation of the Commodity Classification for Foreign Trade Statistics with the Commodity Classification for Industry Statistics*. The survey (cf. 1.1) also has a useful discussion on the major classifications of goods now in use in Europe (page 44 of the English version).

1.5. Iron and Steel Statistics are dealt with separately by the Dusseldorf Office of the FSO —*Aussenstelle Düsseldorf* (Eisen und Stahlstatistik, 4 Düsseldorf, Jahrstrasse 1).

1.6. *Bundesministerium fur Wirtschaft und Finanzen*, Bonn, for the FRG in total; *Wirtschaftsministerium* for each federal state for the respective federal state. There is no national planning organization in Germany but these organizations deal with industrial problems and planning.

1.7. *Trade Associations*. A list is published in *Verbande, Behorden, Organisationen der Wirtschaft*, Hoppenstedt-Wirtschaftsverlag GmbH, D-6100 Darmstadt.

1.8. *IFO—Institut für Wirtschaftsforschung eV* (IFO Institute for Economic Research), Postingerstrasse 5, 8 Munchen H80. An independent non-profit making organization founded in 1949; its functions are to observe, analyse and forecast short and long term economic trends, to carry out market observation and structural studies, to prepare long-run growth projections, to carry out management polls etc.

2. Publications

2.1. *Statistical Year Book.*

2.2. *Industrie und Handwerk* (*Statistisches Bundesamt*). There are nine different series under this title including:

Reihe 3: Industrielle Produktion. A quarterly survey covering industrial units which in general have ten or more persons engaged. Gives quantity and value of production for about 2,300 commodities, including raw materials, heavy industry, and consumer goods (the commodity classification is in *Warenverzeichnis für die Industriestatistik*). Published quarterly and annually, with occasional cumulative volumes covering several years.

2.3. *Census of Production for 1963 and for 1967.*

2.4. The source of official publications is *W. Kohlhammer GmbH*, Postfach 120, 65 Mainz 42.

2.5. A catalogue of publications of the Federal Statistical Office is published every two years, updated each month in the periodical *Wirtschaft und Statistik.*

HOLLAND

1. Basic sources

1.1. *The Central Bureau of Statistics*, Oostduinlaan 2, The Hague, is the only agency within the Dutch government which collects and publishes statistical information on the industrial, economic and social activities of the country. A free booklet is available on the organization and work of the Bureau. A list of CBS publications is issued annually and updated by monthly additions. An English index to the statistical tables is available.

1.2. *Economic Technical Institutes.* These are independent organizations established in each provincial town and responsible to the local council for research into industry, employment and economic activity in the province.

1.3 *Central Planning Bureau*, Van Stolkweg 14, The Hague: one of the most experienced planning bureaux in the world. One hundred and thirty-three monographs had been written up to January 1972, many of these being on the problems of economic measurement, forecasting and model building. There are also three occasional papers. A full list of the publications is issued and there is an English translation of an article by the present director, Professor C. A. van den Beld, published in the Central Planning Bureau Monograph Series No. 12, entitled *The Central Planning Bureau at Work 1945–1970*.

1.4. *Ministry of Economic Affairs.* Among the departments there is the Directorate of Economic Information and Export Promotion, The Hague, 151 Bezuidenhoutseweg. The role of the Directorate is to promote the economic development of the Netherlands in general and the exchange of goods and services between the Netherlands and other countries in particular, by means of information, encouragement and propaganda.

1.5. *Landbouw-Economisch Instituut*, Conradkade 175, The Hague. Mainly macro-economic information. A year book and a list of publications are available.

1.6. Industry boards and central industry boards have been set up for each of forty industries. These industries correspond to the annual production reports referred to in 2.3. A review of the background to industrial organizations is given in an English version of a paper available from the Sociaal-Economische Raad. Government departments are listed in a directory (*Staatsalmanak*) available from Staatsdrukkerij en Uitgeneringbedrijf, Christoffel Plantijnstraat, The Hague.

2. Publications (Statistics)

2.1. *Statistical Yearbook.* General statistics on industry, economy, labour, crime, etc. A monthly version is also available.

2.2. *Manufacturing industry monthly statistical bulletin.* Includes information on orders, investment, employment, etc. as well as output, for most of the important industry sectors.

2.3. *Production Statistics.* A unique series with separate annual volumes for each of the industry/product classifications—shipbuilding, footwear, carpets. The coverage includes output, purchases, employment, number of suppliers, investment, etc. In addition to the tables each report contains a commentary, and for certain sections, historical figures are given in the tables.

2.4. *Census of Production.* Includes information on the number, size and region of establishments. The last census was for 1963 and it will not be repeated again until 1973.

Other publications

2.5. *Economy of the Netherlands 1968.* 139 pp, free, from the Dutch Embassy, 38 Hyde Park Gate, London SW7.

2.6. *Economic Quarterly Review.* Amsterdam/Rotterdam Bank. Includes a statistical appendix. Available free from the Netherlands Chamber of Commerce in the UK, The Dutch House, 307–308 High Holborn, London EC1V 7LS.

2.7. *Commerce and industry in the Netherlands: a base for business operations in Europe.* 1969. Amsterdam-Rotterdam Bank. 59 pp. (Available free from the Netherlands Chamber of Commerce in the UK, The Dutch House, 307–308 High Holborn, London WC1V 7LS.)

2.8. 'The Dutch market for British consumer goods.' Article in *Board of Trade Journal*, **196**, 3771, 25th June 1969, p. 1737–41.

2.9. *Economic Report: Netherlands.* 1970. Export Promotion Section. Overseas Department, Lloyds Bank Ltd, 6 Eastcheap, London EC3P 3AB. 12 pp. Free.

2.10. 'The Netherlands as a market for capital goods.' Article in *Board of Trade Journal*, **196**, 3770, 18th June 1969, p. 1669–71.

ITALY

1. Basic sources

1.1. *Istituto Centrale di Statistica* (*ISTAT*) (Central Institute of Statistics), via Cesare Balbo 16, Roma. An independent body but for all practical purposes a government institution.

A catalogue of publications is available from *Libreria ISTAT*, via A. Depretis 82, 00100 Rome.

Classificazione delle attira economiche (1971)—lists the classification system for industry. Other publications on classification and methods of collecting statistics are also available.

1.2. *L'economia industriale italiana* (*Industrial economy of Italy*), Ministero dell'Industria e del Commercio: Direzione Generale della Produzione Industriale. Published annually in two volumes with a restricted circulation. Contains detailed information on each major industry in volume 1.

1.3. *Guida Monaci—annuario amministrativo italiano* (*Guida Monaci—governmental directory of Italy*). SpA Guida Monaci, via Francesco Crispi 10, 00187 Roma/via Vincenzo Monti 86, 20145 Milano. Government and local government departments and offices. National organizations, public offices, societies and institutes, banks, universities, etc.

1.4 *Banco di Sicilia*, 90139 Palermo, Sicily. Publishes an annual review of the economy with very detailed sections on over fifty industries—shipbuilding, motor cars, typewriters, chemicals, etc. The 1971 issue has 362 pages.

1.5. *Banco di Roma*. Publishes bi-monthly a review of the economic conditions in Italy. Frequently includes a detailed article on an industrial sector, e.g. 'The electric household appliances industry—Italy, in January 1971'. These articles are well worth seeking out as they are in considerable depth. An index is published (in English) each year.

1.6. *Banca Commerciale Italiana*, 30 Coleman Street, London, EC2. Publishes free a 148-page booklet—*Vade-mecum for Foreign Investors in Italy*.

1.7. *Association of Italian Joint Stock Companies*—Piazza Venezia 11, 00187 Rome. Publishes an Italian Economic Survey bi-monthly.

2. Publications

2.1. *Annuario Statistico Italiano* (ISTAT, cf. 1.1). Covers whole economy, population, finance, etc. as well as industry; a regional version is available.

2.2. *Bullettino mensila di statistica* (ISTAT)—same coverage as annual.

2.3. *Censimento generale dell'industria e del commercio* (*General census of industry and trade*) (*ISTAT*). In very great detail, especially for the regions, but the last census was for 1961.

2.4. *Annuario di statische industriali* (*Yearbook of industrial statistics*), (ISTAT).

Information sources about the EEC in Europe

2. INFORMATION ON EUROPEAN COMPANIES

George P. Henderson

Director, CBD Research Ltd

Paper presented at an Aslib 'Study session on Europe: a guide to economic and business information for the EEC', London, 25th April 1972

IT is convenient to consider company information enquiries as falling into three groups:

(1) Questions of location and identification, such as, 'What is the address of Ironex S.p.r.l.?' 'Is there a mixing machine manufacturer in Tilburg called "Daub & Verhoven NV"?' 'Is the name of a motor agent in Hamburg spelt "Meisenburg" or "Maysenberg"?'

(2) Identification of companies from factors other than the company's name, e.g. 'Of what company is C. Dijkstra a director?' 'What company operates from 105 bvd Haussmann, Paris?' 'Who makes gas appliances under the trade name "ETNA"?' 'Which companies in Germany make aluminium window blinds?'

(3) Elaboration of information about a specific company—questions such as, 'What is its legal form?' 'When was it established?' 'Who are its directors?' 'What does it make?' 'How many employees?' 'Where are its factories?' 'How many shares issued?' 'What is their present market value?' 'What does its balance sheet show?' 'Fixed assets?' 'Current Assets?' 'Who are the shareholders?' 'What are its subsidiaries?' 'Is the person whose name appears on this contract authorized to sign?' 'Has it announced any development plans recently?' 'Does it have agencies in other countries?' 'What is its credit rating?' 'Who are its bankers?'

As I must limit myself to a single group, I shall take group (3), as this is the one that necessitates the use of the widest range of sources.

Sources in turn can best be considered under three broad headings:

A. Statutory documents lodged with the official register and available for public inspection or published in an official gazette.

It is useful to compare the situation in Great Britain with that in the Six; whereas in Great Britain the files of all companies in England and Wales can be seen in London, and of all Scottish companies in Edinburgh, companies in the EEC are registered in their district of domicile, either by the Tribunal du Commerce (France), Amtsgericht (Germany), Chamber of Commerce (Netherlands), or similar authorities. Thus it is necessary, in order to examine or obtain extracts from statutory documents, to know a company's district of domicile; this is made simpler in France—and to a growing extent in other countries—by the compulsory printing of district and registration numbers on companies' letter headings. Conversely, whereas in Great Britain details of new or defunct companies are not published by the Registrar, in each country of the Six an official bulletin is issued either separately, as in France (*Bulletin Official des Annonces Commerciales*)[1] or as a supplement to the official government gazette, recording details of new companies, changes in registered particulars of existing companies, and deletions from the registers. (The situation in this country may be changed when we join the EEC; the European Communities Bill provides that 'the registrar of companies shall cause to be published in the Gazette notice of the issue or receipt by him of documents' such as the certificate of incorporation of a company, a company's annual return, etc.)

B. Publications containing information derived both from the statutory documents and from data supplied voluntarily by the company either in interviews or questionnaires.
Taking first the publications providing financial data on the major quoted companies (equivalents of the *Stock Exchange Year Book*); there is at least one such work for each EEC country. A point of interest is that the seven volumes of *Handbuch der deutschen AG*[2] (Germany) and four volumes of *Recueil Financier*[3] (Belgium) are published in succession throughout the year as company reports accrue; companies appear in random order, and access is through a cumulative index to current and previous editions embodied in each volume.

A number of 'card services' similar to Moodies are issued relating to quoted companies; examples are *Das Spezial Archiv*[4] and *Anlagestudien*[5] in Germany, *Notices SEF*[6] in France, and the *Dossier dell' azionista* in Italy[7].

Two important facts should be borne in mind when using the financial source material described above: first, that differences between British and continental accountancy procedures often make it difficult to establish direct comparisons between companies in the UK and the EEC; second, that a conscious effort is being made to facilitate comparability by the publication of financial data calculated according to procedures codified in the *Méthode européenne* devised by the European Federation of Financial Analysts Societies.

After the financial yearbooks and services the next most fruitful sources are what can best be described as 'informative directories'—reference works such as the *Kompass*[8] series which make a point of including more information (directors, work force, affiliations, etc.) than the more conventional directories. Outstanding examples in this category are the *Handbuch der Grossunternehmen*[9] (Germany) and *Nederlands a b c voor handel en industrie*[10] (Holland). National 'informative directories' such as the above covering all industries are necessarily limited to the larger enterprises, and it is often necessary to supplement them with more specialized or localized directories of which *l'Annuaire de la Mécanique*[11] and *Annuario industriale della Provincia di Milano*[12] are good examples.

A problem of incrasing complexity is that of identifying companies' relationships with one another. We are fortunate in having a very economical starting point in the *Who owns whom*[13] series published by Roskill. Continental equivalents range from *Wer gehört zu wem*,[14] available free to customers of Commerzbank AG, to highly complex services such as *Analyses de groupes DAFSA*[15] and *Wirtschaftliche Verflechtungen in Schaubildern*.[16] *Les Liaisons Financières*[17] (France) has the added virtue of providing not only a company's immediate 'parent or daughter' companies but also 'grandparents' and 'granddaughters'.

It is difficult to compress into a few words the sources of company news emanating from EEC countries. General newspapers such as the *Frankfurter Allgemeine Zeitung*[18] and *Le Figaro*[19] contain important financial and commercial coverage; financial newspapers include some outstanding titles such as *Handelsblatt*[20] and *Börsen-Zeitung*[21] (Germany), *La Vie Française*[22] and *Cote Desfossés*[23] (France) and *Il Sole*[24] (Italy); there are many weekly and monthly journals, of which *L'Entreprise*[25] (France) is well known for its 'league tables' of major companies. Hoppenstedt (Germany), DAFSA (France) and Keesing (Netherlands) each produce various specialist services, mainly for the investor, and *Wertpapier-Mitteilungen*[26] (Germany) embraces no fewer than eight series of reports on companies and their securities

Finally a word about the indexing and abstracting of company news. Two British services provide up-to-date news reports on European companies: 'McCarthy's European Service'[27] and 'European Intelligence'.[28] Apart from these, the only general index to company news items is *F & S International*[29] which is of course world-wide and not specifically European.

C. Services embodying additional information obtained from sources other than A and B. The librarian who relies on published sources is often unaware of the vast amount of activity in the credit reporting agencies, which serve all levels of businesses with information on the creditworthiness of customers. Such agencies of course use the sources described in *A* and *B* above, but also obtain information from suppliers and other business contacts of the companies investigated. Naturally the reports compiled by credit information services are available only to subscribers, who use them almost exclusively for credit control purposes; some agencies however are beginning to realize that the information in their files has wider applications, e.g. for market research purposes. Among the most important names in this field are Dun & Bradstreet, with associated companies in each of the EEC countries, Eurinform (Belgium), Bürgel, Creditreform, Schimmelpfeng and Wys Muller (Germany), Euroinform and Kosmos (Italy) and André Piguet (France).

Having outlined, however briefly, the main sources of information available, it remains for me to say something about the problems involved in their acquisition and use, and possible ways of overcoming them. Some years ago, while researching in the Library of the HWWA-Institut fur Wirtschaftsforschung-Hamburg, I was asked several times, by Germans, for help in finding information about German companies; it struck me then that our friends across the Channel are far less reticent than the English in asking for guidance and whenever time is short I commend this approach; that being said, I believe equally strongly that there is no real substitute for making the effort to learn your own way by using source material, however unfamiliar.

Apart from mere unfamiliarity a major stumbling block for many people is that of language. Much has been done during the past decade to diminish this obstacle so far as major European companies are concerned—information about them in English is available in the 'Extel European Service',[30] *Jane's Major companies of Europe*[31] and *Informations Internationales*;[32] and the *Kompass*[8] series provides a multi-lingual approach to information on some 134,000 industrial enterprises in the EEC. When it is necessary to use foreign-language sources, the tables of 'heading translations' contained in my own publication *European Companies*[33] provide a quick-reference means of identifying the appropriate equivalents of terms such as 'assets', 'profit', 'employees', 'holdings', 'turnover', 'chairman', etc., in most European languages. It must be remembered that differences between British and continental company law, and in accounting and stock exchange procedures, often make it impossible to relate terms to comparable items in British company descriptions; examples of this are the 'Vorstand' and 'Aufsichtsrat' in German management structure and terms such as 'SICOVAM prix net' in French share valuations. To those who need to acquire an understanding of the terms used in the administration of companies in the EEC, I strongly commend *Companies in the Common Market*[34] by Professor Robert Pennington.

I have mentioned many publications and services which you may consider desirable acquisitions for the libraries of companies enlarging their business with the EEC; a warning about costs would not be inappropriate. The *Stock Exchange Year Book* sells for a modest £15; its Belgian and German equivalents are priced at £84 and £115 respectively. You can obtain the UK and Continental editions of *Who owns whom* for a total of £34; but *Liaisons financières* will cost you about £65 and *Wirtschaftliche Verflechtungen* £145. The complete Moodies service for about 5,000 British companies costs £260 per annum, whereas its nearest French equivalent (about 1,400 companies) is priced at £443 and a more sophisticated service at £3,250. My advice to anyone setting up a company information unit is: (1) find out if there is a British-produced publication or service suitable to your needs; if not, then (2) make quite sure you know the price of a continental item before ordering it.

Lastly, the time factor; publishers of expensive annual reference works, both in Great Britain and Europe, try to match print orders very closely to expected sales, and the publication you need may be out of print during much of its year of currency. Wherever it is possible to use foresight by ordering publications in anticipation of an expected requirement it is advisable to do so.

I have endeavoured to say something about a massive amount of material in an impossibly short space of time; for every title I have mentioned and every point I have made there are a dozen of equal importance. Two points I wish to make in conclusion. (1) Whenever you can, make personal contact with the librarians of commercial information units in the EEC (such as the Economische Vorlichtingsdient at the Hague). They are always helpful and are often glad to have reciprocal help with questions relating to British companies. (2) As compiler of *European Companies* I am always pleased to hear from those who have come across sources not mentioned in that publication and, if I can, to help with specific company information problems.

Company information work is a challenging task; in the context of Britain's entry into the EEC it will make great demands on our resources and expertise; I hope that many of you will find, as I have done, that it can be both stimulating and rewarding.

REFERENCES

1 *Bulletin officiel des annonces commerciales.* Direction des Journaux Officiels, Paris.
2 *Handbuch der deutschen Aktiengesellschaften.* Verlag Hoppenstedt & Co., Darmstadt.
3 *Le Recueil financier.* Etablissements Emile Bruylant, Bruxelles.
4 *Das Spezial-Archiv der deutschen Wirtschaft.* Verlag Hoppenstedt & Co., Darmstadt.
5 *Anlagestudien über in- und auslandische Gesellschaften.* Deutsche Gesellschaft für Anlageberatung mbH (DEGAB), Frankfurt/Main.
6 *Notices SEF—documentation économique et financière sur les sociétés par actions.* Société de Documentation et d'Analyses Financières—DAFSA, Paris.
7 *Dossier dell azionista.* SASIP s.n.c., Milano.
8 *Kompass.* Kompass Publishers Ltd, Croydon.
10 *Nederlands a b c voor handel en industrie.* ABC voor Handel en Industrie CV, Haarlem.
11 *Annuaire de la mécanique.* Fédération et Syndicats des Industries Mécaniques et Transformatrices des Métaux. Paris.
12 *Annuario industriale della Provincia di Milano.* Associazione Industriale Lombarda, Milano.
13 *Who owns whom* (Continental and UK editions). O. W. Roskill (Reports) Ltd, London.
14 *Wer gehort zu wem—Mutter und Tochtergesellschaften von A–Z.* Commerzbank AG, Hamburg.
15 *Analyses de groupes.* Société de Documentation et d'Analyses Financières—DAFSA, Paris.
16 *Wirtschaftliche und finanzielle Verflechtungen in Schaubildern.* Verlag Hoppenstedt & Co., Darmstadt.
17 *Les liaisons financières des entreprises françaises.* Société de Documentation et d'Analyses Financières—DAFSA, Paris.
18 *Frankfurter Allgemeine Zeitung für Deutschland.* Frankfurt/Main.
19 *Le Figaro,* Paris.
20 *Handelsblatt—Deutsche Wirtschaftszeitung.* Handelsblatt GmbH, Düsseldorf.
21 *Borsen-Zeitung.* Verlag Borsen-Zeitung, Frankfurt/Main.
22 *La Vie Française,* Paris.
23 *Cote Desfossés.* Société de la Cote Desfossés, Paris.
24 *Il Sole—24 Ore,* Milano.
25 *L'Entreprise,* Paris.
26 *Wertpapier-Mitteilungen: Fachorgan für das gesamte Wertpapierwesen.* Verlag 'Wertpapier-Mitteilungen', Koln.
27 McCarthy's European service. McCarthy Information Ltd, London.
28 European intelligence. European Intelligence Ltd, Tunbridge Wells, Kent.
29 *F & S index international.* Predicasts, Cleveland, Ohio, USA.
30 Extel European company service. Extel Statistical Services Ltd, London.
31 *Jane's major companies of Europe.* Jane's Yearbooks, London.
32 *Informations internationales.* Société de Documentation et d'Analyses Financières—DAFSA, Paris; and Verlag Hoppenstedt & Co, Darmstadt.
33 *European companies: a guide to sources of information.* CBD Research Ltd, Beckenham, Kent.
34 *Companies in the Common Market,* by Robert R. Pennington. Solicitors' Law Stationery Society Ltd., London.

CURRENT AWARENESS LIST

Recent additions to the Aslib library catalogue are broken down into twelve broad groups, whose coverage is indicated below. These groups are not mutually exclusive but it is hoped that users will find them helpful in scanning for new items of interest.

User Studies
Analyses of information-seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory.

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject Organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies; reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies; directories.

JANET WALKLEY
Librarian

CURRENT AWARENESS LIST

Items are available in the Aslib Library and may be borrowed unless marked to indicate reference copies*

User Studies

WHITTAKER, KENNETH
Using libraries, 3rd ed. London: Deutsch, 1972. 0-233-96358-8.
140p.

WILKIN, A. P. *and others*
Standard times for data systems: a method for data collection and analysis.
Journal of Documentation, vol.28, no.2, June 1972, p.131–50.

POLLOCK, N. C.
Information needs of top management.
Information Scientist, vol.6, no.2, June 1972, p.61–74.
The purpose, sources and presentation of management information.

JAIN, A. K.
Sampling in-library book use.
Journal of the American Society for Information Science, vol.2, no.3, May–June 1972, p.150–5.
A new method for sampling in-library use of books.

Communication and Knowledge

GARVEY, W. D. *and others*
Research studies in patterns of scientific communication. II. The role of the national meeting in scientific and technical communication.
Information Storage & Retrieval, vol.8, no.4, August 1972, p.159–69.

KALTWASSER, FRANZ GEORG
The quest for universal bibliographical control.
Wilson Library Bulletin, vol.46, no.10, June 1972, p.894–901.
Updated version of article in *Unesco Bulletin for Libraries*, 25 (5), 1971.
Examines 3 areas: sources of bibliographic data and consequences for national bibliographics: standardization for data exchange: and organizational problems.

KOOPS, W. R. H.
A center for statistical data on national libraries.
Libri, vol.22, no.2, 1972, p.153–4.
A report on efforts to obtain a file of current national library statistics.

UNESCO
Communication.
Unesco Chronicle, vol.18, no.7, July 1972, p.289–95.
Unesco's planned contribution to information dissemination in 1973–4.

NATIONAL ACADEMY OF SCIENCES. Computer Science and Engineering Board. Information Systems Panel.
Libraries and information technology: a national system challenge. Washington (D.C.): the Academy, 1972. 0-309-01938-9.
xi, 84p.

Information Processing Systems

CAMERON, JAMES SLAGLE
Automatic document pseudoclassification and retrieval by word frequency techniques. Columbus (Ohio): Ohio State University. Computer and Information Science Research Centre. March 1972.
vii, 165p. (OSU-CISRC-TR-72-4)

MORRIS, MARGARET S.
In-house searching of Chemical Abstracts Services.
Sci-Tech News, vol.26, no.2, Summer 1972, p.40–1.
SDI services using CAS tapes at Allied Chemical Corporation.

OLSEN, KIRSTEN
The Decision Matrix™ Information System for indexing and selection.
Journal of Micrographics, vol.5, no.5, May 1972, p.245–9.
A system which uses special footnoting and category title display on microfiche to expand optical coincidence indexing possibilities.

BYRNE, J. G. *and* CURRIVAN, P. J.
A current awareness service based on INSPEC tapes.
Information Storage & Retrieval, vol.8, no.4, August 1972, p.177–90.
The implementation of TSAR developed for processing MARC records but is concerned with producing an SDI service using INSPEC.

BARLOW, D. H.
Information retrieval.
Computer Bulletin, vol.16, no.5, May 1972, p.250–6.
Describes the INSPEC system and services.

Language and Indexing

MONTGOMERY, CHRISTINE A.
Linguistics and information science.
Journal of the American Society for Information Science, vol.2, no.3, May–June 1972, p.195–219.
The two subjects are related by their common interest in natural language. A survey of models and techniques in computational linguistics is included.

MCGARRY, K. J., *and* BURRELL, T. W.
Semantics and Logic in the organization of knowledge: an introduction for students of information retrieval. London: Bingley, 1972. 0 85157 134 4.
lv.

WELLISCH, HANS
A flow chart for indexing with a thesaurus.
Journal of the American Society for Information Science, vol.2, no.3, May–June 1972, p.185–94.
The utilization of different possibilities to find prescribed descriptors, identifiers or new index terms in thesauri is aided by using a flow chart.

FISHER, H. LEONARD *and* ELCHESEN, DENNIS R.
Effectiveness of combining title words and index terms in machine retrieval searches.
Nature, vol.238, no.5359, 14th July 1972, p.109–10.
The relative efficiency of searching on titles, index terms and both simultaneously, tested on citations from *Nuclear Science Abstracts*.

LONG, PHILIP L., *and* KILGOUR, FREDERICK G.
A truncated search key title index.
Journal of Library Automation, vol.5, no.1, March 1972, p.17–20.
3,1,1,1 search keys derived from titles are sufficiently specific for on-line retrieval.

PECK, J. D.
Financial aspects of industrial translation.
Incorporated Linguist, vol.11, no.2, April 1972, p.50–1.
Costing translation services from the employer's viewpoint.

Classification and Cataloguing

DEUTSCHE GESELLSCHAFT FUR DOKUMENTATION. Komitee Thesaurusforschung.
Zukunftsplanung in der Thesaurus—und Klassifikationsforschung: Niederschrift eines Arbeitseminars, 10–11. Dezember 1971, Dusseldorf. Frankfurt am Main: the Society, 1972.
ii, 46p. (DGD-Schrift (KTF-1) 1/72)

FEDERATION INTERNATIONALE DE DOCUMENTATION. Committee on Classification Research
Proceedings of the second seminar conducted by R. R. Freeman: Frankfurt, 1st–5th June 1970: edited by R. Molgard-Hansen and Margrit Westring-Nielsen. Copenhagen: Danish Centre for Documentation, 1971. 87-7418-012-6.
v, 234p. (FID/CR report no.11; FID Publication no.405)

GILJAREVSKIJ, R. S.
The universal decimal classification and its role in the evolution of information retrieval.
Rivista dell'Informazione, vol.3, no.2, April 1972 p.85–9.
History and future requirements of U.D.C.

CROGHAN, ANTHONY
The Dewey Decimal Classification and its 18th edition.
Library Association Record, vol.74, no.7, July 1972, p.120–1.
A review including a criticism of C. D. Batty's programmed text as an introduction to its use.

RANGANATHAN, S. R.
Social sciences: emergence and scope.
Library Science with a Slant to Documentation, vol.9, no.1, March 1972, p.63–86.
The problems of classifying the social sciences and a criticism of the present schemes.

HAZELTON, ROBERT S.
Cataloguing geometry.
Journal of Library Automation, vol.5, no.1, March 1972, p.12–16.
Presents a theory of classification which considers a library and books as three-dimensional entities.

BHATTACHARYYA, G.
Choice of the heading of the main entry: simple book by single author.
Library Science With A Slant To Documentation, vol.9, no.1, March 1972, p.121–38.
A comparative study of the rules of Ranganathan's Classified Catalogue Code and the Anglo-American Cataloguing Rules.

Mechanization

PFLUG, G.
Information retrieval system.
Libri, vol.22, no.1, 1972, p.85–92.
Present capabilities of computerized information retrieval, and forecasts for the future.

LINGENBERG, WALTER
Central organizations for automation in the libraries of the German Federal Republic.
Libri, vol.22, no.2, 1972, p.155–62.
Surveys national and regional associations.

PATRINOSTRO, FRANK *and* SANDERS, NANCY P.
A survey of automated activities in the libraries of Great Britain and the Commonwealth Countries: vol.2: World survey series. Tempe (Ariz.): LARC Association, 1972.
lv.

DUCHESNE, RODERICK M.
MARC et SUPERMARC.
Bulletin des Bibliothèques de France, vol.17, no.4, April 1972, p.153–72.
The differences between British and American use of the MARC II format necessitates the creation of a truly international format.

DOWNEY, MAURICE W.
Data collection and transcription in the cataloguing section: report on a pilot project in the ETHZ Library, Zurich.
Libri, vol.22, no.1, 1972, p.58–76.
Automated cataloguing in the library of the Eidgenossische Technische Hochschule, which finds the MARC format unsuitable for its particular needs.

FENSKE, RUTH E.
Mechanization of library procedures in the medium-sized medical library: XIV: correlations between National Library of Medicine classification numbers and MeSH Headings.
Bulletin of the Medical Library Association vol.60, no.2, April 1972, p.319–24.

VAN DYKE, VERN J., *and* AYER, NANCY L.
Multipurpose Cataloguing And Indexing System (CAIN) at the National Agricultural Library.
Journal of Library Automation, vol.5, no.1, March 1972, p.21–9.
The computerized system for recording NAL collections and producing various bibliographies.

ROTH, DANA L.
Scientific serial lists.
Journal of Library Automation, vol.5, no.1, March 1972, p.51–7.
The computerized production of a serials holdings list by the California Institute of Technology Library.

PEDLEY, J. B.
Computer analysis of thermochemical data: final report for the period October 1969–December 1971: report to OSTI on Project S1/17/39A. (Brighton): Sussex University. School of Molecular Sciences, May 1972.
41p. (OSTI Report no.5123)

POLTON, D. J.
A computer process for substructure searches on compound structures ciphered in the IUPAC notation.
Information Storage & Retrieval, vol.8, no.4, August 1972, p.191–201.
Version of paper given at Chemical Society Meeting, Southampton, 1969.

STERN, B. T.
Design principles for an on-line information system accessing multiple files and using microfiches—FISHROD.
Beckenham: Wellcome Foundation, 1972.
8p.

BORMAN, LORRAINE *and* MITTMAN, B.
Interactive search of bibliographic data bases in an academic environment.
Journal of the American Society for Information Science, vol.2, no.3 May–June 1972, p.164–71.
Use of the Remote Information Query System (RIQS) at Northwestern University.

BACK, HARRY B.
What information dissemination studies imply concerning the design of on-line reference retrieval system.
Journal of the American Society for Information Science, vol.2, no.3, May–June 1972, p.156–63.
Studies of information dissemination are reviewed as a basis for determining how on-line retrieval can best compete with other sources of references.

AAGAARD, JAMES S.
An interactive computer-based circulation system: design and development.
Journal of Library Automation, vol.5, no.1, March 1972, p.3–11.
The on-line system installed in the Northwestern University Library.

MAXSON, ELIZABETH *and* SPRINKLE, M. D.
Extending library services by using a new technology.
Bulletin of the Medical Library Association, vol.60, no.2, April 1972, p.310–14.
The University of Kentucky Medical Library is experimenting with an In-WATS (Wide Area Telephone Service) line to provide medical library services, drug information, and bibliographic support to the Ohio Valley Regional Medical Program (OVRMP).

Subject Organization

BLAGDEN, JOHN
Special libraries.
Library Association Record, vol.74, no.7, July 1972, p.122–3.
The relation of special librarianship to unions, other kinds of librarianship and education is reviewed.

DOUVILLE, JUDITH A.
Technical information centers: specialized services to science and technology: an overview.
Journal of the American Society for Information Science, vol.2, no.3, May–June 1972, p.176–84.
The purposes, practices and problems of such centres and their relations with the 'national' special library.

CREPS, JOHN E. *and* CARRIGY, JOHN W.
The engineer's worldwide, transdisciplinary information service.
Sci-Tech News, vol.26, no.2, Summer 1972, p. 42–44.
Outlines the Engineering Index service.

WRIGHT, P.
Information centre profile: New England Research Application Center.
Information: Part 1, vol.4, no.2, March–April 1972, p.111–13.

Reprography

TYRRELL, ARTHUR
Basics of reprography. London: Focal Press, 1972. 0 240 50719 3.
243p.

MAXWELL, MONTY M.
Unconventional photographic systems: How will they change your library?
Wilson Library Bulletin, vol.46, no.6, February 1972, p.518–24.
How systems not using silver halide or not requiring wet processing (including holography) may eventually affect library operations.

COMPUTER output microfilm: COM in the library: when, why and how.
Australian Special Libraries News, vol.5, no.3, May 1972, p.39–48.
Briefly surveys developments in COM technology, equipment, etc.

GORDON, RONALD F.
Microform programs and operations at DDC.
Journals of Micrographics, vol.5, no.5, May 1972, p.229–31.
The use of microform by the Defense Documentation Center to make DOD reports available.

Printing and Publishing

COPYING *v.* COPYRIGHT
Time, May 1972, p.36.
The National Library of Medicine copyright case.

BORENIUS, G. *and* SCHWARZ, S.
Remarks on the use of citation data predictive models of scientific activity.
Information Storage & Retrieval, vol. 8, no.4, August 1972, p.171–5.

Administration and Management

ALLEN, ALBERT H.
Systems to manage the industrial library.
Journal of Systems Management, vol.23, no.6, June 1972, p.24–7.
Use of queuing theory, Bradford distribution and rank correlation method for handling problems.

CAREY, R. J. P.
A systems approach to exploitation.
New Library World, vol.73, no.865, July 1972, p.347–9.
How to best design and fulfil objectives in an academic library.

CHILDERS, THOMAS
Managing the quality of reference/information service.
Library Quarterly, vol.42, no.2, April 1972, p.212–17.
The method of unobtrusive measurement of the quality of library service from the user's viewpoint.

CHESHIER, ROBERT G.
Fees for service in medical library networks.
Bulletin of the Medical Library Association vol.60, no.2, April 1972, p.325–32.
Since 1969 the Cleveland Health Sciences Library has run a fee-for-service arrangement to provide library, consultation and other services to its Institutional Membership.

SCHOFIELD, J. L.
School of Oriental and African Studies: a form for the financial control of book ordering.
International Library Review, vol.4, no.3, July 1972, p.341–6.

CAMERON, DONALD F. *and* HEIM, PEGGY
How well are they paid?: compensation structures of professional librarians in college and university libraries, 1970–71: the second survey. Washington, (D.C.) Council Library Resources, February 1972.
24p.

DARLING, LOUISE
Manpower for medical libraries.
Bulletin of the Medical Library Association, vol.60, no.2, April 1972, p.286–7.
A general introduction to manpower problems in medical libraries.

BAUMANN, HELENE

Organisation eines Redaktionsund totoarchius als Teil einer Bibliothek und Dokumentationsstelle.
Nachrichten, Nouvelles, Notizie, vol.48, no.3, 1972, p.115–27.
The establishment of a cuttings and photographs archive for the Swiss journla publishers, COOP SCHWEIZ.

RANGANATHAN, S. R.

Difficulties of government documents.
Library Science With A Slant To Documentation, vol.9, no.1, March 1972, p.83–120.
Problems of cataloguing government publications and the significance of the work of Dr James Childs.

SEYMOUR, CAROL A.

Weeding the collection: a review of research on identifying obsolete stock: part 1: monographs.
Libri, vol.22, no.2, 1972, p.137–48.

GREAT BRITAIN. Department of Education and Science.

Public lending right: report of the working party appointed by the Paymaster General. London: H.M.S.O. 1972, 11 270263 5.
vii, 30p.

PUBLIC LENDING RIGHT

The Author, vol.83, no.2, Summer 1972, p.65–82.
A joint statement by the Society of Authors and Publishers Association and an outline of the Working Party report.

Library Systems

EVANS, A. J.

Meeting of non-governmental organizations with a particular interest in UNISIST and its implementation.
IFLA News, no.41, July 1972, p.22–3.
A short report of the Paris meeting. 2nd–3rd March 1972 to discuss the needs of UNISIST and its organization.

TAYLOR, ROBERT S.

The making of a library: the academic library in transition: Hampshire College working paper number 2. New York, London: Becker & Hayes, 1972. 0-471-84831-X.
xiii, 250p.

DOUGHERTY, RICHARD M.

The paradoxes of library cooperation; with commentary by Ralph Blasingame, Thomas J. Calvin, Ellsworth Mason, John F. Anderson and Robert S. Ake.
Library Journal, vol.97, no.9, 15th May 1972, p.1767–75.
Criticism of past and current efforts at co-operation, with 5 commentaries.

EUROPEAN CONFERENCE ON THE INTERNATIONAL EXCHANGE OF PUBLICATIONS, Vienna, 1972.

European Conference on the International Exchange of Publications.
IFLA News, no.41, July 1972, p.20–2.
Reproduces in full the conference resolutions.

PALMOUR, VERNON E. *and others*

A study of the characteristics, costs and magnitude of interlibrary loans in academic libraries, by Vernon E. Palmour, Edward C. Bryant, Nancy W. Caldwell and Lucy M. Gray. Westport (Conn.): Greenwood *for* Association of Research Libraries, 1972. 0-8371-6340-4.
ix, 127p.

Professional Activity

WASSERMAN, PAUL

Frontiers in librarianship: Proceedings of the Change Institute 1969.
Westport (Conn.): Greenwood *for* Maryland University. School of Library and Information Services, (Contributions in Librarianship and information science no.2) 1972. 0-8371-5823-0.
viii, 440p.

BOLL, JOHN J.

A basis for library education.
Library Quarterly, vol.42, no.2, April 1972, p.195–211.
The pressures currently besetting library education, and the need for a nationwide study of professional trends and needs as the basis for solving these pressures.

DAILY, JAY E.

Teaching the rotton core.
Library Journal, vol.97, no.9, May 1972, p.1778–83.
A critical look at library school teaching.

MACK, E.

Information staff training.
Information Scientist, vol.6, no.2, June 1972, p.51–9.
Covers formal and in-service training.

CULKIN, PATRICIA B.

CAI experiment.
American Libraries, vol.3, no.6, June 1972, p.643–5.
The use of computer-aided instruction to teach reference work at Denver University.

ZACHERT, MARTHA JANE K.

Preparation for medical librarianship: status and potential.
Bulletin of the Medical Library Association, vol.60, no.2, April 1972, p.301–9.
A criticism of the educational programs currently operating and a recommendation that the Medical Library Association's role in this sphere should be extended.

DEAN, JOHN
Planning library education programmes: a study of the problems involved in the management and operation of library schools in the developing countries.
London: Deutsch, 1972. 0-233-95760-X.
137p.

WHEATLEY, G. W. J.
Learning resources and college libraries: with particular reference to college of further education libraries.
Hatfield: Hertis, May 1972. 85267 03 62.
38p. (Hertis occasional papers no.6).

WHITE, BRENDA
Research in information for planning.
Aslib Transport and Planning Group Newsletter, no.5, June 1972, p.3–5.
Outlines the Edinburgh project to investigate the foundations of planning information services.

LANDAU, T.
Who's who in librarianship and information science. 2nd ed. London: Abelard-Schuman, 1972. 0 200 71871 1.
v, 311p.

NATIONAL CENTRAL LIBRARY
LASER (London and South Eastern Library Region) directory. London: the Library, (1972?)
ii, 68p.

WASSERMAN, PAUL *and others*
LIST 1972: Library and information science today: an international registry of research and innovation, 2nd ed., by Paul Wasserman, Jeanne O'Connell, Margaret Harper and Ronald Johnson. New York: Science Associates/International, 1972. 0 87837 001 3.
xiv, 519p.

MEMBERS' ADVERTISEMENTS

Acceptance of advertisements for publication in Proceedings *does not imply Aslib support for or endorsement of the goods or services advertised.*

Members' advertisement rates: first 15 words (minimum), 50p; 3p for each additional word. 10p if box number required. (No agency discount.) A separate section of these columns is available to non-members at £3 per s.c.i.

Translations services

MEDICAL AND HIGHLY SPECIALIZED SCIENTIFIC TRANSLATIONS. S.M. Bonnekamp, FIL, Member of the Translators' Guild (Med. Science & Lit.), 47 Firs Close, Muswell Hill, London, N10. Tel. 01-883 3962 during office hours. After office hours an automatic telephone answering machine will record messages.

BUILDING AND CIVIL ENGINEERING TRANSLATIONS from Russian and German into English. G. L. Cairns, MIL, 19 Kingsley Place, London N6. Tel. 01-340 8990.

TECHNICAL SWEDISH, DANISH, NORWEGIAN translated by J. T. Craddock, B COM, FIL, Ekard, Ray Park Avenue, Maidenhead, Berks. Maidenhead 24931.

JAPANESE/ENGLISH, RUSSIAN/ENGLISH translations. Chemistry, medicine, biology, zoology. D. A. Fraser, BA, MIL, 22 Gresley Road, London, N19 3JZ. Tel. 01-272 5664.

WILFRED E. GOODAY, ARSM, DIC, C.ENG, MIMM, FIL. Member of Translators' Guild, Romanian and French. 161 Rivermead Court, London SW6. RENown 1912.

SCIENTIFIC TRANSLATIONS FROM JAPANESE, CHINESE, RUSSIAN, CZECH and other East and West European languages into English and/or German. A. K. Henn, BSC, 'Glenside', Lower Leigh Rd., Pontnewynydd, Pontypool, Mon. Tel. Pontypool 3689 (after 6 p.m.).

MEDICAL, PHARMACEUTICAL, BIOLOGICAL translations from French, Romanian and Portuguese into English and from English into French and Romanian. Dr. J. Jacobson, 94 Temple Fortune Lane, NW11. 01-455 1010.

TECHNICAL TRANSLATIONS from Russian, German and Polish into English. B. Klipstein, BSC(HONS), 1 Glenview Grove, Shipley, Yorkshire. Tel. Shipley 58215.

TECHNICAL AND COMMERCIAL translations from English into Russian. Mrs O. Linsley, 31 Parke Road, Barnes, London SW13. Tel. 01-748 8822.

TECHNICAL TRANSLATIONS from Japanese into English. R. A. Scutt, BA, 48 Somerset Avenue, West Wimbledon, London SW20. Tel. WIMbledon 1713 (01-946 1713).

TECHNICAL OR COMMERCIAL translations into/from English, German, Dutch and French. A. M. H. Speller, FIL NGV, 6 Lakeside, West Ealing, London W13 8HN. Tel. 01-998 1045.

AUTHORITATIVE TECHNICAL TRANSLATIONS. Spanish, French, Italian, German, Portuguese, camera copy or printed. E. W. Sykes, FIL, 39 West Close, Wembley, Middlesex, HA9 9PJ. Tel. 01-904 4273.

Advisory services

IRAS: A NEW ADVISORY SERVICE. As much or as little advice and assistance as you need—anything from a half-day's talk to a six-months' assignment. Miss Helen Townley, I.R. Advisory Services, 117 Wickham Chase, West Wickham, Kent, BR4 0BQ. 01-777 7560.

INDEXERS/ABSTRACTERS, FREELANCE/PART-TIME. I.R. Advisory Services has list of over 40 experienced people in wide range of disciplines, on whom you may draw in emergency or for free-lancing. 117 Wickham Chase, West Wickham, BR4 0BQ.

NON-MEMBERS' ADVERTISEMENTS

YOUR COMPANY HISTORY—whether book or booklet, commission a full-time professional industrial historian to research and write it. Hugh Barty-King, BA(CANTAB), Holgate House, Ticehurst, Wadhurst, Sussex. Tel. Ticehurst (05807) 557.

TRANSLATOR, FRENCH–ENGLISH. MA Degree in French, Sorbonne-trained, five years' teaching experience, much travelled. Seeks post with industrial firm. Write to: B. Brinton, c/o G. Walker, 17 Queen Anne's Grove, Acton, London W.4. Tel. 01-994 2812.

Dutch Translator

Shell International Petroleum Company Limited require a Technical Translator to join a young team in London, engaged in the translation of technical, scientific and commercial material covering a wide range of subjects. Some proof reading will also be required.

He or she must have a good degree or equivalent in Dutch with preferably French and/or German. Experience in translation work is desirable, and an ability to type would be an advantage. Age range 22-35.

Attractive terms of employment are offered, plus the many facilities available in Shell Centre, near Waterloo Station. Please apply in writing, giving brief details of age, qualifications and experience to: Shell International Petroleum Company Limited, PNEL/32, Shell Centre, London, SE1 7NA.

Wellcome

Information Scientist

The duties of this post, which is in the Clinical Research Division at our Group Headquarters in London, will be mainly concerned with the setting up and maintenance of an index of information relating to adverse reactions. It will be of particular interest to life science graduates, age 25–40, with at least three years' experience in information work and a knowledge of information retrieval systems.

This is an attractive appointment in a British owned international pharmaceutical organisation and the salary and conditions of service are good.

Please write quoting reference PR.20 to the Personnel Manager, International Services, **THE WELLCOME FOUNDATION LIMITED,** 183 Euston Road, London NW1 2BP.

Western Australian
Institute of Technology

DEPARTMENT OF LIBRARY STUDIES

Applications are invited from professionally qualified Graduates for appointment in the following fields:

School and Children Librarianship

Systems Analysis and Data Processing (in relation to library operations)

The Social Context of Librarianship

Physical Bibliography and Special Materials

Appointments will be made at Senior Lecturer, Lecturer and Senior Tutor level.

Salaries:	Senior Lecturer	$A9,644	$A11,234
	Lecturer	$A6,801	$A 9,390
	Senior Tutor	$A5,474	$A 6,403

Further particulars and method of application available from the Official Secretary, Western Australia House, 115 Strand, London WC2R 0AJ.

When writing please quote L54 and specify the position of interest.

I.R. ADVISORY SERVICES

the consultancy that **knows** what IR is all about

- *drawing up a thesaurus?*
- *wondering about feature cards?*
- *considering COM?*
- *planning a new SDI system ?*
- *designing a new printed index?*

Don't create a special appointment for your development work. Be economical and call in IRAS to do it for you.

H. C. & K. TOWNLEY LTD., 117 WICKHAM CHASE,
WEST WICKHAM BR4 OBQ.

British Librarianship and Information Science
1966–1970

EDITED BY H. A. WHATLEY

A review of progress in the late sixties

£8 (£6.40 *to L.A. Members*)

Still available

Five Years' Work in Librarianship 1961–5

EDITED BY PHILIP SEWELL

£5.75 (£4.60 *to L.A. Members*)

THE LIBRARY ASSOCIATION

British Technology Index

CURRENT SUBJECT GUIDE TO BRITISH TECHNICAL JOURNALS

FOR TRACING AND RECALL

of { specific recent } information

in the Field of Applied Science, Engineering and Manufacturing Technology

Monthly Parts and Annual Volume

THE LIBRARY ASSOCIATION

7 Ridgmount St. Store St. London, WC1 7AE
(Phone: 01-636 7543)

LIBRARY BINDING

This has been our trade since the last century, and in practising our craft we have given service to all types of libraries in many corners of the World.

We like to think we still bind books for libraries rather well, apart from our other activities as publishers and booksellers.

CEDRIC CHIVERS LTD

PORTWAY
BATH BA1 3NF

FIRST for carpets
Dodson Bull

UP TO 30% DISCOUNT
BRANDED CARPETS

● All makes available with full Manufacturers' Guarantees ● NO IMPERFECT GOODS SOLD ● Free delivery in U.K. ● Expert fitting service available

£200,000 carpets on display
in our extensive London and provincial showrooms

Free brochure on request to Dept. ALB

DODSON BULL CARPET CO. LTD.

LONDON: 5 & 6 Old Bailey EC4M 7JD. Tel: 01-248 7971
BIRMINGHAM: 164 Edmund St B3 2HB.
Tel: (021) 236 5862
BOURNEMOUTH: 268 Old Christchurch Rd BH1 1PH.
Tel: 21248
BRIGHTON: 2-6 North Road BN1 1YA. Tel: 66402
BRISTOL: 2-3 Royal London House, Queen Charlotte St
BS1 4EX. Tel: 28857
LEEDS: 12 Great George St LS1 3DW. Tel: 41451
MANCHESTER: 55-61 Lever St M1 1DE.
Tel: (061) 236 3687/8/9
NEWCASTLE-upon-TYNE: 90-92 Pilgrim St NE1 6SG.
Tel: 20321/21428
WESTCLIFF-on-SEA: 495 London Rd SS0 9LG.
Tel: Southend 46569
9.00-5.30 Mon.-Fri. Sat. 9.00-12.00 (Manchester 9.00-4.00)

Asian Publications from Mansell

South Asian Government Bibliographies

The volumes in this series provide the most complete listing of central government publications, serials and non-serials, of Ceylon, India, and Pakistan so far compiled. This vital record of primary sources for the study of South Asian affairs is available as a three-volume set or individually by country.

Three volumes 10 x 7 in. 350 pages Approx. 7,000 entries
£9.50 sterling or US $25.00

Union Catalogue of Asian Publications

An author listing of most books from Asia purchased by British libraries since 1965, this catalogue includes books published in all languages in Asia outside the Soviet Union and those published in Arabic or the Ethiopic languages in North Africa. With the exception of pure science and technology, all subjects are covered and the 58,000 different titles range from modern works to works of great rarity published three or four hundred years ago.

Four volumes (primary sequence) 13¾ x 10⅛ in. Approx. 66,000 entries each
£155.00 sterling or US $400.00

Individual brochures are available from the publishers

Mansell 3 Bloomsbury Place, London WC1A 2QA, England

Thesaurus Construction

A PRACTICAL MANUAL

by Jean Aitchison
and Alan Gilchrist

The emphasis in this book is on practicality and conciseness. Theoretical aspects have been reduced to a minimum, the reader being referred to other texts where this has been considered useful. The first section deals with system design, at which stage the type of thesaurus should be chosen to match system requirements. Subsequent sections describe the various components of different thesauri and a number of possible forms of presentation. The text concludes with a hypothetical case-study enumerating all the steps in thesaurus construction.

SBN 85142 042 7 *£2.50 net; £2.00 to members*

Aslib Publications

Published in England by Aslib, 3 Belgrave Square, London SW1X 8PL
Printed by Alden & Mowbray Ltd at the Alden Press, Oxford

18 DEC 1972

CALCUTTA UNIVERSITY
CENTRAL LIBRARY

Aslib Proceedings

incorporating Aslib Information

TOMORROW'S INFORMATION WORKER: EDUCATION AND TRAINING

INFORMATION WORK AND WORKERS IN THE COMING DECADE

1. *Manpower requirements and training* B. J. PERRY 556

2. *Roles and systems: the need for change* B. T. STERN 562

The place of professional education in higher education in the future BRYAN THWAITES 565

WHAT EDUCATIONAL PROGRAMME IS REQUIRED TO PRODUCE THE NECESSARY SPECIALISTS?

1. *The programme that exists and omissions* T. BRIMELOW 570

2. *Education of information specialists for the 1970s* HERBERT SCHUR 574

UDC revise or relegate? G. A. LLOYD, D. NEWCOMBE, J. ROLAND SMITH and A. C. FOSKETT 580

ASLIB · 3 BELGRAVE SQUARE · LONDON SW1

Aslib Proc. vol. 24 no. 10 pp. 545-604 London, October 1972

A Bibliography on

WATER POLLUTION

and its control

compiled by

H. FISH, O.B.E., B.Sc., F.R.I.C

Chief Purification Officer. Thames Conservancy

CONTENTS

- **Pollution of Inland Waters**
- **Pollution of Tidal Waters and the Sea**
- **Sewage and Sewage Disposal**
- **Industrial Effluent Disposal**
- **Agricultural Pollution**
- **Professional Associations, Government Departments and Agencies, River Authorities, and Other Bodies with Responsibilities and Interests in Water Pollution and its Control**
- **List of Bodies with Responsibilities for Publishing Annual Reports Relating to Water Pollution**
- **Journals Relevant to Water Pollution and its Control**

SBN 85638 009 1 Pages 64 Price £6.45

PUBLISHED BY: Gothard House Publications, Gothard House,
Henley-on-Thames, RG9 1AJ, Oxon, England. Tel. 049 12 3602

RSG

A Gothard Group Company

CALCU[illegible] UNIVERSITY
CENTRAL LIBRARY

Aslib Proceedings

incorporating Aslib Information

VOLUME 24 **OCTOBER 1972** **NUMBER 10**

© 1972 Aslib and contributors

Aslib Proceedings: incorporating Aslib Information *is published monthly and supplied free to members of Aslib. Subscription rates are £10 annually to non-members, or £2.50 to Aslib members requiring additional copies. Single copies £1, or 25p to members.*

Further information about Aslib's services and membership rates will be supplied on application to the Director, Aslib, 3 Belgrave Square, London SW1X 8PL. Tel. 01-235 5050. Telex 23667; answer-back, Aslib London.

ASLIB CALENDAR 1972

November

TUE.7.	Midlands Branch evening meeting and lecture: 'The British Library', by M. B. Line. Imperial Centre Hotel, Birmingham. 6.15 p.m.
MON.13.	Co-ordinate Indexing Group meeting. Aslib. 3.30 p.m.
WED.15.	Midlands Branch one-day conference: 'HMSO—its services and problems associated'. University of Nottingham. 10 a.m.–4 p.m.
THU.16.	One-day joint conference (with Institute of Information Scientists and LA): 'The British Library's service to users', 7 Ridgmount St, WC1.
FRI.17.	Technical Translation Group meeting, film show and sherry party. Aslib. 4 p.m.
TUE.21.	Aslib one-day study conference: 'Management in a service context'. 36 George Street, Manchester.
	Economic and Business Information Group evening visits (running concurrently): 'The Times' Library, or 'The Financial Times' Library. Printing House Square/Bracken House, EC4.
WED.22.	Aslib evening meeting: 'Summary of projects in hand by Aslib R & D Department', by B. C. Vickery. Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1. 5 for 5.30 p.m.
THU.30.	Social Sciences Group one-day conference: 'Information and library services for social services departments and other agencies'. NISWT, 5 Tavistock Place, WC1.

December

MON.4.	Economic and Business Information/Social Sciences Group joint evening meeting: 'Social statistics', by Mrs M. Nissell (Central Statistical Office). Royal Institution of Naval Architects, 10 Upper Belgrave St, SW1. 5 for 5.30 p.m.
WED.6.	Technical Translation Group meeting. Claude Gill Books, Oxford Street, W1. 5.30 p.m.
MON.11.	Co-ordinate Indexing Group meeting. Aslib. 3.30 p.m.
WED.20.	Aslib Christmas Party. Aslib. 5.30 p.m.

ASLIB INFORMATION

Public Lending Right

In an attempt to ensure a fair reward for those authors who, for one reason or another, do not receive adequate remuneration for their work, the Paymaster-General set up a working party in March 1971 to advise him on ways of implementing a hypothetical amendment to the Copyright Act 1956, which would add 'lending to the public' to those acts restricted by copyright. The working party's report was published in May 1972, and Aslib, together with a number of other interested organizations, was invited to comment. The report has been the subject of intensive study during the summer by the External Relations Committee of Aslib and a statement of views based on its discussions has been approved by the Council and presented to the Paymaster-General. The text of this statement is published below.

This matter is of vital concern to all members of Aslib. The practical consequence is that, if legislative action is taken on the lines of the working party's report, virtually every library in the country will face an annual levy, or some other form of financial charge, which has been estimated to be in the region of 20–25 per cent of its expenditure on literature. In fact, the report is firmly based on the false premise that authors are underpaid because libraries buy and lend their works, and on an illogical definition of public lending expressed as 'use unaccompanied by ownership'. Perhaps the worst aspect of the whole matter is that if, as the report suggests, virtually every type of library would come within the scope of legislation by the mere fact of its being a library, much of the progress made during the last half-century under enlightened public policies towards the development of effective special library and information services would be lost.

Aslib has taken the initiative on behalf of its members in urging the Government to seek other, more equitable and less damaging, ways of ensuring fair rewards for any authors it considers to be inadequately remunerated; no doubt member companies and institutions will also wish to consider what steps they should take individually.

PUBLIC LENDING RIGHT

Comments submitted by Aslib to the Paymaster-General on the Report of a Working Party appointed by him

SUMMARY

Aslib recognizes the right of an author to fair rewards for his work, but sees nothing in the report of the working party to convince it that the appropriate way to achieve this is through extension of the Copyright Act. The report's proposals appear to be ill-founded in principle, likely to defeat their own purpose, and certain to have consequences damaging to long-established public policies for the effective utilization of specialized information in industry, the public services and elsewhere.

DETAILED OBSERVATIONS

1. *We do not accept the underlying argument that authors are underpaid because libraries lend their works.* Moreover, many authors, e.g. writers on scientific, technical, economic and other specialist subjects whose works form a substantial part of the stock of specialist libraries, would never be published but for the existence of a guaranteed library market.

2. *These specialist authors cannot be equated with the creative writer.* Their primary motivation is usually professional recognition and status rather than financial gain. For many, also, authorship is part of their salaried commitment to their employing institutions. It would be proper to distinguish between these different circumstances of authorship, but it is difficult to see how this could be done if a remedy to the problem is sought in legislation.

3. *The working party's definition of 'lending' as 'use unaccompanied by ownership' is illogical.* Lending is an act of the owner, but use is an act of the borrower. The logical consequence of this choice of definition is to place the onus of responsibility on the borrower, not on the lender, yet the report leaps, illogically, to an assumption of responsibility on the part of the lender, i.e. the library.

4. *The report fails to take account of the all-important question of the relationship(s) between lender and borrower which might have pointed to a more reliable definition.* A borrower may use a document for his own benefit, that of a third party or that of the owner himself. In the latter case no act of 'public lending' takes place in any sensible or logical meaning of the term.

Examples:
(a) A company library lends a document to a member of the company's design staff for use in the preparation of a design for a customer or for another department of the company.
(b) An educational establishment receives a grant for a piece of research and uses part of it to acquire the documentary material required by the researcher who then uses it.

'Use unaccompanied by ownership' suggests that an act of 'public lending' has taken place in each case, which common sense refutes.

5. *Additional expense on the scale necessary to achieve the report's object would, if applicable to industrial and business libraries, nullify the public policy of encouraging industrial development through the use of scientific, technical, economic and other information.*

For fifty years, successive Governments (through DSIR and more recently DES and DTI) have sought to encourage industry and business to increase their effectiveness through the systematic exploitation of information by organized company libraries. The future of many such libraries is already uncertain because of economic circumstances. Managements are in no mood, and often not in a position, to augment their already exiguous book funds to meet an unproductive expense. Two undesirable consequences of the report's proposals can be foreseen with certainty:

(a) industrial libraries will be disbanded and their material dispersed into small, inefficient, personal, window-ledge collections of books, thus undoing most of what has been achieved by the policies of the last fifty years.

(b) fewer books will be bought with the limited book-fund allocations, thus defeating the object of the proposed legislation.

6. *Similar ill-effects can be foreseen for all types of libraries which have the purpose of fostering the use of specialized information.*

Almost all specialized libraries—in scientific societies, technical institutions, technical colleges, research associations and a wide variety of other specialist bodies—are under acute financial pressure. Their contribution to the advancement of research and education is very great, but their ability to contribute would be severely curtailed by any further charge upon their limited funds which stand no hope of being increased to meet this new expense.

7. *The nation-wide schemes developed during the last half-century for inter-lending specialist material would be discontinued.*

The use of specialist knowledge in educational and research establishments of all kinds has been greatly assisted, to the national benefit, by the extensive and generous co-operation of special libraries whose primary responsibility is to their own institutions. These co-operative schemes have been developed to a pitch at which they are both the envy of, and a model for, numerous other countries, but they would certainly be among the first victims of financial retrenchment resulting from the report's proposals.

8. *Desirable developments pending in certain public services are likely to be shelved indefinitely.*

Public policies followed hitherto have brought about a new and desirable growth point for special library services in a number of important fields. Hospital Boards and Planning Departments in Local Authorities, for example, have for several years been moving towards a recognition of their need for organized library services to meet their complex information needs. The extra costs of a public lending right would be likely to set back these desirable developments.

Aslib concludes from all the foregoing considerations that the introduction of a public lending right to be financed in any of the ways proposed would be inequitable, self-defeating, and damaging to the national interest as expressed in established policies for the systematic use of specialized information. It urges the Government to seek other means of ensuring that authors are adequately rewarded for their work where this is not the case already.

POINTS REQUIRING SPECIAL CONSIDERATION IF GOVERNMENT ACTION IS INTENDED

If, notwithstanding the ill-effects mentioned above, the Government should decide to proceed on the lines of the report, we invite attention to the following matters:

1. *Periodicals and journals*

   (a) These are frequently dealt with differently from books for purposes of copyright, the most common arrangement being that copyright passes to the publisher in return for a once-for-all fee. Some special arrangements would seem to be necessary to ensure authors benefit as intended.

   (b) A growing number of periodical publishers in specialized fields already charge more to libraries than to other purchasers. It would be inequitable to include these within the scope of the legislation proposed.

   (c) There is a growing tendency in scientific publishing to publish only abstracts of articles, the complete journal consisting of a single copy on microfilm held centrally; the potential reader selects material of interest to him by reference to the published abstracts and asks for a full-size paper copy. This is but one of many changes taking place in specialist publishing and it is necessary to recognize that legislation which may seem applicable to present procedures may become irrelevant and inapplicable in a relatively short space of time.

   (d) Controlled circulation journals constitute a significant part of the intake of industrial and business libraries. Some establishments receive them free of charge, others have to buy them, depending upon the publisher's assessment of their market potential for advertisers. It would be difficult to devise equitable treatment for different libraries through legislation.

2. *Foreign material*

Material from foreign sources forms a large part of the intake of most special libraries—in a few cases as much as 75 per cent. Some is purchased, some is acquired under exchange arrangements. It would be inappropriate to take exchange material into account in assessing the levy for an individual library. It would also be inequitable to make a levy in respect of purchased foreign material, whether the levy were used as part of a general fund to pay British authors, or as compensation to foreign authors without full reciprocal arrangements. British commitments to foreign authors under the Berne Convention make the suggested amendment of the Copyright Act particularly inappropriate in this context.

3. *Trade and other directories*

These form an important part of the stock of all types of libraries assisting industry and business. They are seldom advertised to individuals, are normally compiled for the use of corporate bodies and are usually priced high to take account of the limited demand. It would be inequitable if libraries were required to pay a levy in addition in respect of this kind of material.

There are several other categories of material whose position would be similarly anomalous, e.g. books produced by corporate bodies for the indirect advancement of their own interests, such as books on computer systems written and published by manufacturers of computer equipment.

4. *Legal deposit libraries*

Whilst the British Museum Library would presumably be exempt from levy in respect of the published works which it is required by law to collect, the position of the other legal deposit libraries would also need careful consideration. They constitute an important part of the country's archival collection and also have a special function as comprehensive 'out-of-London' collections. Both these roles would be weakened if a levy compelled them to reduce their intake of material.

5. *Method of assessing and collecting levy*

We regard all the methods considered in the report to be cumbersome and administratively costly in relation to the probable benefits. Indeed, we have serious doubts whether any of them would be workable or effective. Marginally the least objectionable would be a system of blanket licensing but the anomalies are such that, in our view, it would be impossible to devise legislation that could be accepted as equitable in its effects.

CONCLUSION

Aslib's concern is primarily with the use of specialized material through the medium of special libraries and special collections in central and local Government, private and nationalized industry, public corporations, universities, technical colleges, and institutions, learned and professional societies, the specialist departments of public libraries, and a variety of other bodies concerned with education and research. It is our belief that the legislation envisaged would have seriously adverse results for the enlightened policies, promoted by successive Governments since before the Second World War, for social and industrial development based on the use of systematically-organized recorded knowledge and information; and that the damage caused thereby to the national interest would heavily outweigh any advantages to that sector of the community which it seeks to benefit. We would again urge the Government to seek other, less damaging, means of ensuring fair rewards for any authors it considers to be inadequately remunerated.

Research as an aid to practice

What is Aslib Research and Development Department trying to achieve? What does research give to the average Aslib member? What are the criteria of a useful project? Does research justify its cost?

At an Aslib evening meeting on Wednesday, 22nd November, Mr Brian Vickery, Assistant Director (Research and Development) of Aslib, will discuss these questions in the light of past work, current projects and research being planned at Aslib. Members of the R & D Department will be on hand to answer questions on details of their work.

If you want to learn more about Aslib research—or to press your views as to problems that need investigation—this meeting is your opportunity. It will be held at the Royal Institution of Naval Architects, 10 Upper Belgrave Street, London SW1, and will begin at 5.30 p.m. (tea 5.00 p.m.). The Chairman of the meeting will be Mr Cyril Cleverdon, Librarian of the Cranfield Institute of Technology.

Slides and sound recordings: their organization and exploitation

The Aslib Audio Visual Group has recently published the proceedings of two of their Workshop/conferences on the organization and exploitation of slides and sound recordings. The contents include papers on the early days of the BBC Gramophone Library; sound recordings in public libraries; a tape recordings collection in a technical library; the use of sound in education; organization of slide collections in construction industry libraries; the slide collection of the Fine Arts Library of Westminster City Libraries, and of the Ravensbourne College of Art and Design; and the use of 35mm transparencies in the National Health Service.

The publication is available from the Treasurer of the Audio Visual Group, Miss Frances Thorpe, at 20 Flaxman Terrace, London WC1, price £1.00 to members and £1.25 to non-members.

New advisory service for small firms

Following the recommendation of the Bolton Committee, the Government is to set up a new advisory service for small firms in industry and commerce. Ten Small Firms Centres are to be set up and these will be based on the regional organization of the Department of Trade and Industry. It is hoped that the service will become operational in the Spring of 1973.

The Government is also following the Bolton Committee's advice and terminating the DTI's financial support for the Industrial Liaison Centre Service at the end of July, 1973.

Further information can be obtained from: Department of Trade and Industry, Millbank Tower, Millbank, London SW1P 4QU. Tel. 01-834 2255, Ext. 66.

Nature, use and organization of statistical collections

The Library Association and the Royal Statistical Society are holding a further residential study course on the 'Nature, use and organisation of statistical collections' at the University of Warwick from 13th to 15th December, 1972. Intended for librarians and information officers who handle statistical material, the course is similar in content to those held at Brighton and Harrogate in 1971, but will also include several sessions of practical work.

Further information and booking forms from the Research Officer, the Library Association, 7 Ridgmount Street, London WC1E 7AE.

The cost for residents is £20 and for non-residents £12. Closing date for receipt of applications is 24th November.

Current Programs: a new current awareness service

The World Meetings Information Center are to begin a new current awareness service based on the programmes of scientific and technical conferences and meetings. Called *Current Programs*, this monthly publication will give the titles of the papers and names and addresses of the first authors listed in the programmes of about 1,200 international, national and regional meetings each year. Information will also be given on all preprints, reprints, proceedings or abstract publications expected to issue from each meeting.

Further details and information on pricing (expected to be under $100 per year) are available from: World Meetings Information Center, 824 Boylston Street, Chestnut Hill, Massachusetts 02167.

Tailored Abstracts (TABS) from INSPEC

INSPEC have begun a new information service for the individual scientist, engineer and manager. Called TABS (Tailored Abstracts) the service provides subset selections to the recipient's choice of *Electrical & Electronics Abstracts* (*EEA*) or *Computer & Control Abstracts* (*CCA*). TABS sheets give abstracts of those articles in areas specified by the user, and each month the subscriber receives complete reprints of the Journal chapters he has chosen from the thirty-four available in *EEA* or the twenty-one available in *CCA*.

More details of TABS can be obtained from INSPEC Marketing Department, IEE, Savoy Place, London WC2R 0BL.

BIOSIS and CAS begin co-operative systems programme

BioSciences Information Service of Biological Abstracts (BIOSIS) and the American Chemical Society's Chemical Abstracts Service (CAS) have decided to carry out a programme of operational co-operation and co-ordination.

Some of the specific objectives agreed upon by the two organizations are: development of a single index to library holdings of periodicals covered by the two services; establishment of a common system for identifying documents; development of compatible subject terminology authority files; use of the same abstracts in both services where feasible and possible eventual elimination of duplicate publishing of abstracts; and adoption of common processing standards and development of compatible computer-readable, microform and printed services where feasible.

For further information contact: *at BIOSIS*, James P. Murphy, Manager, Professional Services Department, 2100 Arch Street, Philadelphia, Pa. 19103, USA; *at CAS*, E. P. Donnell, CAS, University Post Office, Columbus, Ohio 43210, USA.

Cunningham International Fellowship Grant for 1973–74

The American Medical Library Association is offering a six-month fellowship during the period September 1973 to June 1974 which provides for observation and supervised work in one or more medical libraries in the United States or Canada, enrolment in a course in medical librarianship, and a limited amount of travel.

Candidates must be graduates working in a medical library or preparing to work in one, and should hold a library qualification. The Association will pay: a maintenance grant of £400 per month while in the US or Canada; tuition fees; and approved travel expenses within North America. Travel to North America must be paid for by the fellow.

Application forms and further information are obtainable from: Dr Carroll F. Reynolds, Chairman, MLA Committee on International Co-operation, Falk Library of the Health Professions, University of Pittsburgh, Pittsburgh, Pennsylvania 15213, USA.

Mr J. E. Wright retires

Mr J. E. Wright, a well-known figure in Aslib circles for a quarter of a century, has recently retired from his post as Librarian of the Institution of Electrical Engineers which he has held since 1947. For ten years he was Honorary Treasurer of Aslib following the amalgamation in 1949 of the former Association of Special Libraries and Information Bureaux with the British Society for International Bibliography to form the Aslib we know today. In that capacity, he carried, in partnership with Mr G. Woledge the Honorary Secretary, the main responsibility for the removal of Aslib at the beginning of 1950 from the two rooms it then occupied in Bloomsbury Street to what seemed, in comparison, the palatial accommodation of six rooms in Palace Gate, Kensington.

Mr Wright will also be remembered for his energetic and enthusiastic discharge of two other duties on behalf of Aslib over a long period—first as the organizer of successive annual conferences of the Electronics Group and, second, as an Aslib representative on the BSI committee responsible for the development of the English language versions of the UDC, and of which he is the chairman.

His friends in Aslib wish him many happy years of retirement.

Death of Dr J. G. Pearce, CBE

Members will have heard with deep regret of the death on 13th September of Dr J. G. Pearce, one of the small band of people interested in technical information who founded Aslib in 1924. Like the late Professor R. S. Hutton, the other prime mover in the creation of what was originally known as the

Association of Special Libraries and Information Bureaux, he retained his interest in Aslib's fortunes for the rest of his life.

Dr Pearce, who was 81 at the time of his death, was Director of the British Cast Iron Research Association for thirty-four years, retiring in 1958. He was awarded the OBE in 1950 and the CBE in 1957.

BRIEF REVIEWS

BROWN, J. E. The Canadian national scientific and technical information (STI) system. A progress report. Philadelphia: National Federation of Scientific Abstracting and Indexing Services, 1972. (*1972 Miles Conrad Memorial Lecture.*)

The Director of the National Science Library (a Division of the National Research Council) here describes a rather unique decentralized system, which is in effect an 'information transferral agency'. Besides providing a question and answer service, photocopies of documents and acting as a Clearing House for technical reports, the National Science Library runs the Canadian programme for the selective dissemination of information (SDI) to individual scientists, engineers and others all over Canada. This computer-based current awareness service uses nine different magnetic tape stores obtained from outside the country. Together they cover some 15,000 scientific and technical periodicals.

SHEEHY, EUGENE P. Guide to reference books. Eighth edition, third supplement, 1969–1970. Chicago: American Library Association, 1972. 190 pp. $4.50.

The latest supplement to the eighth edition of Constance M. Winchell's *Guide to Reference Books* contains details and descriptions of a further 1,200 reference works covering the period 1969–70, together with a few older works received too late to be included in the second supplement, 1967–68. A very few 1971 publications have been noted if their addition completes a set or indicates an important change of title.

The list of ALA reviewing journals has been added to considerably, increasing the number from three to fifteen.

Once again the supplement features the useful cumulative index which covers the previously published supplements.

TAUBERT, SIGFRED. *ed.* The book trade of the world. Vol. 1: Europe and international section. Hamburg, London: Verlag für Buchmarkt-Forschung, Deutsch, 1972. 543 pp. £8.50. (ISBN 3 578 06596 X.)

This is the first volume of a three-volume set covering the book trade internationally and in individual European countries. (Volume 2 will cover the Americas and Australasia and Volume 3, Africa and Asia.)

The first section, dealing with the international scene, is divided into thirty-five sections, under such headings as 'book design', 'book fairs', 'literary prizes', 'retail prices', 'training', 'translations' etc. Within this part, too, are two sections, arranged by country, giving details of the history, sponsors, addresses, opening times, functions, special fields, and stock and bibliography of book museums and of special libraries devoted to publishing and bookselling.

The second part, also arranged by country, contains a chapter on the book trade in each of thirty European states, contributed generally by a national expert. For ease of comparison, material is arranged under the thirty-five headings used in the international section.

The work closes with appendices on: international book trade statistics; statistics of translations; the Unesco Florence agreement; the Book Trade Answer Code; and members of international copyright conventions.

The major possible drawback to the use of national experts in such a work is that their intimate knowledge of affairs in their own country will be offset by nationalistic propaganda. This has been generally resisted, but it is far more difficult to assess what skeletons have been concealed. Nevertheless, the work remains a mine of data and details for reference work.

WADSWORTH, JILL *and* GLOVER, M. W. *comps.* An index to the proceedings of the nine international congresses on high speed photography 1952–1970. Farnborough: Central Unit for Scientific Photography, Royal Aircraft Establishment, 1972. 158 pp. £1.50. (Available from DTI Technology Reports Centre, Orpington, Kent BR5 3RF.)

The body of this index consists of details of the eight hundred or so papers presented at these nine congresses, listed alphabetically by the first author. Each entry includes: the title of the paper, or abstract if the title is uninformative; the congress at which the paper was presented; paper number and initial page only. The affiliation of the author at the time of presentation is also given and the publication has an index by organization. Authors, other than the first, are listed separately. The publication also has a detailed subject index. Full bibliographical details of the individual congress proceedings are provided. This publication should prove a useful tool, both to those who hold copies of the full proceedings and to those who may be involved in tracing bibliographical details of individual papers.

Information work and workers in the coming decade

1. MANPOWER REQUIREMENTS AND TRAINING

B. J. Perry

Office for Scientific and Technical Information
Department of Education and Science

Paper presented at an Aslib one-day Symposium on 'Tomorrow's information worker: education and training', London, 21st June 1972

IN THE twenty minutes available, it will be difficult to deal in any great detail with either of the aspects embodied in the title of my talk. What I shall do is to touch upon:

1. The present 'state-of-the-art' of manpower forecasting in this area;
2. some changing factors that could affect manpower requirements; and
3. the effects these changes could have upon training requirements.

Inevitably, I shall produce more questions than answers, but many of the areas will be dealt with by later speakers as well and it is to be hoped that a balanced approach to the whole problem will emerge by the end of the day. In view of the tentative and opinionative nature of many of my statements, it is perhaps necessary to add that any opinions expressed are my own and do not necessarily reflect those of my Department!

First, then, we have the problem of forecasting manpower requirements for information work. Experience in trying to provide future estimates for various activities has given me a personal sympathy for the Arab proverb that warns that 'he who is not a seer should not attempt to predict the future'. It is essential, however, that we should have guidelines for future planning, otherwise there is a great danger of either not having enough information workers to exploit the full potential of information resources or, alternatively, of producing too many information workers for too few jobs.

Factual data on the supply and 'demand' of information workers, more especially those in the library field, have been collected for many years and include such sources as the IMTA/SCT *Public Library Statistics,* the Library Association's censuses on the grading of professional posts in public libraries etc., and these sources have been surveyed by Dr D. W. G. Clements.[1] There have, however, been only two major attempts to forecast manpower requirements in this field on a long-term basis. The first results from an OSTI survey of staff engaged in scientific and technical information work, which was undertaken in 1965,[2] and the second was contained in the Library Advisory Councils' *Report on the supply and training of librarians.*[3] Both reports provided valuable statistics on the current employment situation and both attempted forecasts of future demand. The scientific and technical information staff survey asked management to give estimates of their staff requirements for 1970 but many respondents declined to do this. However, they did provide figures to show that between 1960 and 1965 there was a rise of approximately 60 per cent in the numbers employed on scientific and technical information work as defined in the survey. From what figures were provided, it was estimated that there could be a rise of 40 per cent in the years between 1965 and 1970. Unfortunately, for various reasons, it was not possible to check this prediction in 1970 but it is a sobering thought that if the 40 per cent increase were maintained over the following five-year periods, by 1980 there would be over 9,000 information workers in science and technology and if the growth rate between 1960 and 1965 had been maintained, the figure would be over 14,000. Unfortunately, I doubt that the Director of Aslib will be able to confirm that such a growth of workers will be reflected in the growth of Aslib's membership! Any attempt to forecast manpower requirements which depends upon long-term estimates by industry is bound to be very much a 'guesstimate'—as Dr Brosan (Director of the North-East London Polytechnic) pointed out earlier this year[4] when he referred to the excess provision of sandwich courses by polytechnics who had based this provision on industry's indication of future needs. However, the failure to obtain adequate responses to requests for manpower forecasts is not surprising—the economic and social conditions of any country vary greatly from year to year (in some cases from month to month) and manpower requirements are entirely dependent upon these conditions.

The LACs' report used a variety of data from several different sources to estimate the future demand for qualified librarians. In spite of the fact that, at the time the report was issued, the amount of detailed data on demand was not as great as now exists, the estimate that was made of an annual demand of not more than 1,400 qualified librarians was (reflected in total annual enrolments of between 1,500 and 1,600 and allowing for wastage) more or less matched by events. But the report greatly underestimated the proportion of graduates that would be included in this number—in 1970–71, for instance, there were about nine hundred postgraduate and first degree enrolments (or 55 per cent of the total), compared with the report's estimated 470 annually.

That there are restrictions to accurate manpower forecasting must be accepted, but the need for some more accurate predictions is pressing. In 1970, DES set up a Committee on Library Statistics to consider what data should be collected. As a result of the deliberations of this Committee and its working groups, the Department designed the questionnaire which is at present being used in the 'National census of staff in librarianship and information work'. The primary purpose of this census is to give as accurate a picture as possible of the employment situation at 31st March of this year. The accuracy of the figures depends very much upon the completeness of the returns and present indications are that this is very good, being over 80 per cent in many sectors. Forms have been issued to over five and a half thousand institutions and if the rate of returns is continued, this will be the most comprehensive manpower survey undertaken in this area.

Apart from being of itself a very useful source of up-dated statistics, and a useful check against previous predictions, it is intended that the survey will provide data as a basic input to a manpower model for this area which will consider as far as possible all factors that make up the demand for staff and which, hopefully, will be reactive to changes in these factors. This means that much more data than that collected by the census will have to be fed in. Some of this data will be extracted from existing statistics, some from special studies and some from the results of various research projects being sponsored by both OSTI and the Arts and Libraries Branch of DES. Among factors which it is hoped to include in the model are changes in numbers of users, rates of publication, manpower use, technological applications, organization of local government and co-ordination and co-operation between organizations. Obviously collecting all the data involved will take many years and the full model is unlikely to be available for at least four years, but it is hoped that the results of the census will be available at the end of this year and that, on the basis of some studies, some projections, albeit incomplete, can be made before the full model is constructed.

I mentioned that I would touch on some factors that could affect manpower requirements, but I think it fair to say now that I do not intend to indulge in any 'blue sky' thinking. The basic cynicism about predictive studies contained in the Arab proverb I quoted earlier has been echoed by, amongst others, Drucker who in his book *Managing for results*[5] has pointed out that we know only two things about the future:

(a) It cannot be known; and
(b) it will be different from what exists now and from what we now expect.

He goes on to suggest that any attempt to base today's action and commitments on the prediction of future events is futile, and that the best we can do is to anticipate future effects of events that have already irrevocably happened. Frankly, being neither the possessor of a crystal ball nor trained in the interpretation of avian entrails I have great sympathy with this approach. I would like to look very briefly at one or two current activities that could have a bearing on the future of information workers.

The most immediately obvious is the effect of the increasing application of new technologies to the information field. This is so far advanced already that, on the basis that the required resources will be available, we can see some of the effects this will have in the future. I do not intend to concentrate on this area in any way, since the next speaker will consider the implications of several aspects in detail, but I would like to mention one or two points. First, automation will, hopefully, remove the necessity for many of the duplicated clerical-type processes in libraries and information centres, correspondingly, and also hopefully, it will release highly trained staff from at least part of such activities as in-house cataloguing and indexing for the much more vital jobs of 'customer relations' in the form of reader services and dynamic information services. However, this raises the question as to whether the persons that have carried out what are largely 'behind the scenes' jobs are the best selected and the best trained for inter-personal-relationships of this type. Secondly, information workers' heavy involvement with mechanized systems has brought them into close contact with computer scientists and systems designers and this and their involvement with the actual design of systems has meant that they have had to acquire, either formally or informally, a great deal of knowledge about computerized information processing—this raises the point as to how far educational facilities should go in including computer science and systems analysis in formal training in librarianship and information science. No one would doubt that courses of the 'appreciation' level are needed for all information workers but I wonder how much deeper these courses really need to go except where information workers intend to research into the field? What does come out of current experience is the need for the information profession seriously to consider what its relationship should be with the other professions that contribute to its operational activities.

Another 'current event' which certainly will have effects in the future is that economic pressures are being brought to bear with increasingly severe consequences on all aspects of information work. In this context, and as logical extension of the effects of the application of new technologies to the information field, I make no apologies for raising the new 'fashion' in information work—management. The intellectual aspects of management consist of policy-making, decision-making and control. Of course all information workers can claim that they practise these aspects in their every day existence, if only applied to that most precious of all resources—their own time; but there are many management skills that can be taught formally and, in spite of the sterling work carried on in several schools, I would hold that no sufficient attention has really been paid to how and how much management should form part of the training of the information worker. He needs such skills, not just effectively to manage his own resources but also to present his economic defence at times when he is subjected to economic pressures. He also needs to be provided with skills to put him on equal footing with his colleagues from other fields in the management structure. It is a sad fact that the information profession has, when compared with other professions, very few examples of its members moving into senior management positions that are not dependent upon the actual type of professional qualifications and it may be that the information profession should take a leaf from the book of the British Computer Society, a member of whose education board has recently listed[6] the following points as long-term objectives that computer educationalists should keep in mind: the acceptance among general management of the computer department as more than a specialist section, and a part of the management scene; the recognition of computer personnel as having an established career structure within the managerial structure; and appreciation by general management of the value of data processing experience towards the all-round development of younger managers.

Associated with this is the need to re-examine the functions of the information worker in all aspects of information handling in enterprises. What, for instance, is the relevance of information training to the way that the accountant handles his financial figures, the sales manager his sales results and the marketing manager his market survey data? Does the information worker have a function here, and if so, what effect should this have on his training and education?

Closely associated with the problems of the information field and management is the whole problem of the most efficient use of staff resources and trained manpower. To date, this has scarcely been touched upon as far as the information worker is concerned but two research projects that are of interest to this area have recently been initiated. The first, which is supported by OSTI, is sited at the Postgraduate School of Librarianship and Information Science at Sheffield and includes such aspects as the identification and analysis of professional tasks in all aspects of librarianship and information work and the determination of the level, qualifications and qualities required to carry them out. The second, commissioned by the Arts and Libraries Branch of DES, will be carried out by the Local Authorities Management Services and Computer Committee. This will look at all activities of non-manual staff in public libraries and will collect data on the trained manpower requirements of the public library system. It is also hoped to form a basis for revised standards of provision for all types of public library staff. Both these projects will feed data into the manpower model that I have mentioned, but they will also provide, well before the end of the present decade, information with which the profession can accurately examine various jobs at different levels and which can form the basis for any decisions that are taken on the relative positions of professional and sub-professional work.

Increasing accentuation on international co-operation is, of course, another 'current event' that could have a great effect upon the information worker of the future. Apart from raising questions as to which, and at what level, languages will be necessary, it is quite likely that possible increased internationalism of career prospects in information work will call for greater emphasis on education in other types of information systems and other ways of looking at information problems that at present are literally and metaphorically 'foreign' to many UK information workers.

I have given a few examples of changes that could affect manpower requirements and their implications for training and education. To go more deeply into these would merely duplicate what later speakers will cover but I would like to stress that the information profession is, and for many years to come will be, in a period of rapid and constant change—much greater than that for any other profession. This means that we shall be more than ever dependent upon well-designed and effective short courses—for reorientation, for disseminating new ideas and for bringing basic information up to date. If we are serious about being professionals, then individuals must be prepared to 'go back to school' regularly and management must be prepared to release them for this purpose. In order to increase the effectiveness of such courses, we must also be prepared to experiment much more seriously with all available methods of tuition and learning.

Perhaps I may conclude by introducing one factor that is not directly concerned with training or education but which is one that could greatly affect the manpower requirements of the future. This is to a large extent covered by that strange term the 'image of information work'. I think that now is the time for the profession (if one profession it be!) to look very seriously indeed at what it really is and what it should be, where the best career prospects lie and where the services offered by the profession should begin and end. Most importantly, it should examine very closely the desirable characteristics of people it should encourage to join the profession. It is to be hoped that at least some indications will come from the research projects that I mentioned earlier. In the last analysis, I strongly believe that good information workers, like good managers, are born and not made and that all the education and training we can give will be wasted unless we can attract the right people.

REFERENCES

1. CLEMENTS, D. W. G. Demand for and supply of trained librarians. *Library Association Record,* 73, 2, February 1971, p. 25–7.
2. EDWARDS, A. P. J. A national survey of staff employed on scientific and technical information work. *Journal of Documentation,* **22,** 3, September 1966, p. 210–44.
3. LIBRARY ADVISORY COUNCIL (ENGLAND) *and* LIBRARY ADVISORY COUNCIL (WALES). *A report on the supply and training of librarians.* London: HMSO, 1968.
4. See, for instance, *The Times,* 9th February 1972.
5. DRUCKER, PETER F. *Managing for Results.* London: Heinemann, 1964. (Chapter 11.)
6. *Electronics Weekly,* 14th June 1972, p. 32.

Information work and workers in the coming decade

2. ROLES AND SYSTEMS: THE NEED FOR CHANGE

B. T. Stern

Head of Research Information (Group),
The Wellcome Foundation Ltd

Paper presented at an Aslib one-day Symposium on 'Tomorrow's information worker: education and training', London, 21st June 1972

DURING THE REST of this decade there will be substantial changes in the type of activities carried out by information workers, both as a result of improvements in technology to provide more effective information systems and also because the users of information will have more sophisticated requirements. Some of these changes are discussed below.

Middlemen

As traditional subject disciplines become merged it will be necessary for information to be presented to the users in a manner which reflects this interdisciplinary approach. The emergence of middlemen as repackagers of information gleaned from separate subjects and offered as an interdisciplinary specialized package will increase. It is likely that the increasing overall volume of available information will lead to a greater number of such specialist services which will make use of available computer tapes. The price of such services can be expected to decrease in the next few years, but this fall in price is likely to be slow unless there is a considerable increase in the number of organizations capable of handling the output from such repackaged tape services. If, however, subsidies to these services were available, there would be a likely increase in the number of 'profile services' which might then become self-supporting at the effectively lower price, once the number of customers to the service had been increased by virtue of the lower price.

Publishers' responsibility

Following from the above requirement for tape services of an interdisciplinary nature, publishers should recognize that the provision of a computer tape service as a spin-off activity and produced as a by-product of their publishing programme is unlikely to provide them with a satisfactory source of income unless they accept the need for a uniform record format. Such a format would make the task of repackaging the information cheaper and quicker. In the long-term, if publishers accept that computer tape services are to play an integral part in the provision of information, then those tape services will become a prime source of income and their conventional publishing a by-product of that tape. This is a reversal of the current situation.

Costs

Information workers will place much greater emphasis on costs in the future as it will be necessary to access larger and larger banks of information. Industry will demand that information activities are not given lip service in terms of cost effectiveness and there will be increasing demands from management for a demonstration of the benefits accruing to the organization as a direct result of the information department. Without such demonstrable cost benefit the future evolution of information services is limited and is likely to be restricted to the traditional documentation activities (which by and large can be served using traditional methods with occasional access to a computer for housekeeping activities).

Information storage

The cost of disc storage on a computer has dropped dramatically. In 1967 the monthly rental per 1×10^6 characters was £45, in 1970 was £10 and a recent ICL announcement shows that by 1973 it will be £6.25. Put differently, if we take Negus and Hall's figures[1] for the number of characters in references and journal articles, the cost of storing the references in the 1970 *Chemical Abstracts* (excluding indexes) in 1970 would have been £540 and of the full texts £27,000. On the basis of an abstract having an average of 1×10^3 characters the cost of storing the text of the abstracts per month would have been £2,700.

A really significant fall in the cost of computer storage could occur when optical storage with a higher packing density than the present magnetic storage becomes available. In the next decade it is unlikely that full text storage will be an economic proposition for even the largest information services.

The accent on text storage is therefore likely to swing more towards microforms and in particular to the use of microfiches. The use of a visual display unit to compile the search strategy, with the automatic display of text on a microfiche reader linked to the on-line system, might provide a system at lower cost than one where the text itself is stored on disc.

Retrieval of data

Most systems at present retrieve references in response to user requests. It is then necessary for the user to look up the references, to examine abstracts or in some other way to gain a clue as to the information he requires. Potentially more useful is the retrieval of data as a direct result of search strategies based on indexed documents. This will then close the gap between that activity within the computer field which manipulates numerical data, possibly for market research purposes, and the information work which is based upon the journal and report literature. The use of microfiche referred to above at the time of filming could incorporate a flag or suitable mark in the text indicating data which may be required subsequently. This data could be stored in machine-readable form or alternatively could be put into the computer store at a stage when the decision was taken to introduce data manipulation, rather than reference manipulation. Clearly, if the information on data is stored in the computer at the onset there will be no need for subsequent reindexing. Even if the decision to store that data is taken at a later stage, because the concepts have already been indexed and the data identified within the text, there will be a considerable saving in time.

The changed role of information

The changing systems referred to above might lead information scientists to become design or maintenance engineers rather than interpreters of the information. By this it is meant that their role would be the design of new systems in response to demands from users (design engineers) or alternatively they would be concerned with the continued effective working of the system (maintenance engineers). This is an abdication from their broader role in understanding the needs of users and promoting the flow of information in appropriate quantity and quality. Far more work needs to be done in identifying the concepts which alert a user to follow a particular path of activity and not merely to be concerned with the identification of keywords which will retrieve a given piece of paper. If the information activity is going to improve or maintain its position within the industrial and academic environment, it will be necessary for the information workers to study the flow and manipulation of ideas as well as words.

REFERENCE

1. NEGUS, A. E. *and* HALL, J. L. Towards an effective on-line reference, retrieval system. *Inform. Stor. Retr.*, 7, 6th December 1971, p. 249–70.

The place of professional education in higher education in the future

Bryan Thwaites

Principal, Westfield College,
University of London

A 'verbatim' summary of a talk presented at an Aslib one-day Symposium on 'Tomorrow's information worker: education and training', London, 21st June 1972

ON TAKING OFFICE some years ago, an incoming Minister of Education was reported to have said to his senior civil servants something on these lines: 'Never in the field of human conflict has it been more necessary than now to subjugate the universities to the needs of society and at the same time for the universities to retain their academic freedom. Gentlemen, go away and reconcile those two requirements.' Well, of course, those two requirements are still not reconciled and for this morning's purposes I will put the dilemma in the form of a stark question: 'What is higher education for?', and by higher education I mean education after the age of about eighteen.

Now, there are quite a few different possibilities and I have jotted down seven of them in my notes. Trained manpower is the first. The second possibility is both to increase and transmit knowledge. The third possible objective of higher education is the maintenance of a social custom. The fourth is the perpetuation of class differences. The fifth would be that the whole of the higher educational system should be part of the welfare services, in the same way as the national health services. The sixth possibility is that what a particular country does in the realm of higher education is a measure of its own national development. The seventh possibility is that it should provide suitable niches for staff who either cannot or will not do anything else. You yourselves will no doubt think of other possibilities but of those that I have mentioned none is totally trivial, and I would like to enlarge on one or two of them.

The first, the question of trained manpower, holds an apparently attractive idea, that one should assess the national needs for trained manpower and then create the appropriate educational and training institutions to satisfy them. The only trouble about this—and Mr Perry would agree with this from his position in the DES—is that to forecast trained manpower sufficiently accurately from the numerical standpoint is virtually impossible. A major difficulty with this approach is that, such are the time-scales inherent in education and in the career structure of individuals, any error in forecasting shows up only after many years, and so then has to be over-corrected; so the whole system tends to develop a kind of oscillation, which could be unstable. For this and other reasons, this country does not indulge in this approach to higher education, except maybe for one or two very specialized groups of people such as doctors.

Under the second heading, the creation and dissemination of knowledge, we may be running into great difficulties because the concept of the transmission of the accumulated wisdom of the ages is no longer generally accepted as a worthwhile aim in education. If I read the signs in schools aright, most schools have already discarded this concept. I will leave this as the germ of an idea at the moment, and return to it later if there is time.

Thirdly, there is great force in the idea that higher education represents a custom amongst a certain kind of person in the total sociological scene and it is curious that, in spite of lavish grants and other efforts to make higher education available more widely, there is, if anything, a wider gulf than ever before between those who do, and those who do not, continue their formal education after the age of eighteen.

This bears upon my fourth point, namely that if higher education copes with something like 20 per cent of the whole population, the other 80 per cent are supporting the 20 per cent. The majority are paying for the minority so as to enable the minority to become richer than the majority. This is a situation which will lead to great difficulty over the next decade, in a way that it did not when the two proportions were much more disparate.

Then, fifthly—and possibly a little bit more provocatively—one could take the view that, up to about the age of eighteen, the population as a whole has certain welfare needs and that those who go on to higher education are those who feel the need to postpone the choice of remunerative work. Given the lack of motivation among so many of our university students and the fact that so few know what they want to do later on, it could be said that their university career has been a welfare operation directed to them as individuals.

Under the sixth point, it is worth noting that the extent of higher education can get out of step with a country's development. Some of the African countries are already worried by the fact that their graduate output is greater than the country as a whole can absorb. We would be unwise to assume that the UK is immune from similar effects.

I would like to make just one point under item seven—which is also a rather provocative one. I suggest that tenure for staff in higher education is not a good thing. I would like to see the evolution of a system of short-term contracts. I do not see any disadvantage in teachers and staff of institutions of higher education being subject to the same kind of pressure that most people in industry are.

Next, I would like to be a little more specific about the influences over the next ten to twenty years. There are two sets of influences which are in some senses opposed to each other. On one side we have what appears to be an increasing demand from 14–18-year olds for so-called higher education. There is also an apparent unanimity on the part of all the political parties that higher education is a 'good thing' and that more and more money should be spent on it, even though the total provision for education in this country is now the biggest single item in the national budget. And then, too, there is the effect of knowledge which is increasing, some would say, exponentially; and this argues for an ever-increasing system of higher education.

Against these points, there is the single, large problem of cost; for, once the spending on education as a whole is the biggest proportion of the national expenditure, then the taxpayer will begin to look at it most critically. Then there is the general disillusionment with the system that so many students express;

and even more of a 'hot potato' is this mention of 'lowering of standards'. Among these points are some great problems. For example, the attitudes I have just mentioned can change very rapidly which makes it difficult for any Government to plan for higher education in the long term. Or again, our society as a whole is changing so rapidly, that distinctions become blurred; in particular, our young people find it increasingly difficult to 'know where they are'. And as to my 'hot potato', while one can argue indefinitely about the meaning of standards, it nevertheless seems true that, against the structure of knowledge which men have created over the centuries, our present generation of students are appearing increasingly inadequate (through the fault of their elders). This may be irrelevant for the future but I have put it on the one side because I believe that there is virtue in what men have created in the past and that one of the objectives of education is to inculcate the realization of this.

It is time for me to come to look more particularly at the demands of professional education. To illustrate one or two of the points in my mind in thinking about professional education against the general background I have outlined, let us categorize certain professions.

First of all there is what might be called the two fundamental professions: Medicine and Law. These represent the professions which certainly satisfy the criteria that one might build up from the point of view of the accumulated wisdom of the ages of which I have just spoken. They also satisfy the requirement of motivation. They also satisfy another requirement, not yet mentioned, namely that those who enter these professions do so, almost without exception, for life. For these various reasons therefore I describe those as fundamental professions.

Let us now take the examples of Engineering and Teaching and think of them as being graduate professions. These are different from Medicine and Law. It is not true that the young man or woman who enters into training in either of those two spheres is almost certainly going to remain in it for the rest of his or her life. Maybe there are two slightly different reasons for this in the two cases. In Engineering, it may be that the rapid changes that are characteristic of our human activities nowadays imply that the young engineer who comes out of university and starts 'doing' engineering in some sense, will be able to continue on the basis of his past training only for ten to fifteen years. He will find it increasingly hard to keep up with changes in knowledge and techniques, and as often as not he is in some way overtaken after ten to fifteen years by the new entrants into his profession. Thus he presents a management problem for his firm, and different firms have different solutions to it. But the need to move this still youngish man into some other field of activity in mid-career could be said to negate the whole idea of professional education.

Teaching is in a slightly different category, partly because this critical moment in a teacher's career comes rather earlier. The rate of turnover of teachers in some schools is horrific: in some LEA'S, the average length of stay of teachers in certain schools is about two or three years. So the 'moment of truth' in the teaching profession probably occurs much earlier than in the engineering profession. Those who get past that moment, in other words those who stay in teaching, are later faced with the 'rate-of-change' problem: for the natural time period in education is something like twenty years, which is a very long time in the context of some of the changes we have been discussing this morning.

Let us now look at a third category of profession exemplified by the train driver and the technician. I am thinking of the sort of person who starts his job at the age of sixteen or so, soon after the official school leaving age. These are relevant to our discussion today about professional education, for train driving is a skilled specialist job. Yet there are similar problems here: the requirements change: there are different technologies: certain kinds of train drivers find it difficult to switch over, and so on. So why set up an elaborate fixed system for training train drivers if the individuals are not going to be train drivers for very long? Alternatively, why shouldn't you or I, at the age of forty or fifty, decide to be a train driver? It might be very good for many of us, but it would be quite impossible, because of inflexibility in the system. The same is true of many other spheres of work: there is an inflexibility in the total system of professional education: it is very difficult to switch from one field of interest to another. Yet we all know, and surely most of us have experienced this even in our own restricted professional lives, that in our careers we have had to adapt to different situations, different responsibilities, different skills, and so on.

By now, you will have perceived where my remarks are leading. I am questioning the concept of professional education. Moreover, I am wondering whether the coffin of professional education will not be the result of the situation, as I see it, that is developing in schools. Let us briefly look at the school situation as it is now in the 1970s. We see a process of dismantling of selection procedures. Non-selection is the principle, whether in relation to particular kinds of school, or within each school. Thus, within a school, there is no streaming. Everyone goes into the same class, independently of their own interest, abilities, skills and so on. There is also the deliberate breakdown of the subject barriers and hence of structured knowledge; or, to put it differently, there is a breakdown of the barriers between professions. Then again, 'discovery' methods are replacing 'didactic' methods of teaching. Children must not sit in rows as we are here; they must participate.

Largely as a result of these new methods and attitudes, there is now an attitude of egalitarianism in the classroom. There is the idea amongst teachers, especially younger ones, that they as teachers must not give the impression that there is any question of superiority, or indeed distinction, between the teacher and the pupil. They are all on a par. Indeed already in universities one can see this very attitude in students. And this is yet another explanation of why Authority, in the sense of the accumulated wisdom of the ages, is being ignored.

I have two minutes to deal with the implications for Aslib! I will jot down two more symbols on the board. If X denotes the number of people in the world, and Y the number of pieces of information on the average attached to each one of these individuals, then X multiplied by Y, the product of those two quantities, is very roughly the total amount of information that we are, in the largest sense, talking about. Now if Y included basic information such as name and address, age, sex, and so on, then Y would be of the order of one hundred. Then XY would be of the order of 10^{11} and so could, in the present state of computer art, be handled without much difficulty. It is therefore conceivable that, certainly within the next twenty-five years, there could be a United Nations computer with all this information available. If then *Y* was increased slightly for a very small number of individuals to include the books they have written or the papers they have published, then the insignificant increase in *XY* could easily be absorbed. In other words, the library problem looked at from the point of view of a data bank is a trivial subset of the total world information problem, and in our lifetime could very well be solved. Incidentally it is interesting to note that it would not be difficult to increase *Y* by a factor of about one hundred, but that then *XY* would be taken just outside a manageable order of magnitude. That puts our strictly technical interest into a certain perspective.

I have only one other thing to say before I sit down and that is to wonder whether information subsumed under *Y* should be regarded as permanent and indestructible. If it is technically feasible, then is it humanly reasonable that all information under *Y* (including items such as published papers for that very small proportion of *X* who publish papers) should remain permanently available for time immemorial? This is the assumption built—not consciously just historically—into the publication of books. The whole idea of a book is that once it is published it then exists for ever. Is that a reasonable theory of information?

What educational programme is required to produce the necessary specialists?

1. THE PROGRAMME THAT EXISTS AND OMISSIONS

T. Brimelow

Principal Lecturer, School of Information Science
Leeds Polytechnic

Paper presented at an Aslib one-day Symposium on 'Tomorrow's information worker: education and training', London, 21st June 1972

THE SYSTEM of education for information work and librarianship in this country has been essentially a pragmatic development. The cynic may say accidental or even chaotic and to some extent this is true, but it would also be unfair to the organizations and institutions involved. The development of education may appear to have been a gap-filling exercise in that the various institutions have reviewed the scene from time to time and have provided educational services or courses of one kind or another not previously in existence. The build-up of the system has therefore been subejcted to an informal consensus and co-ordination.

The formal educational system for our profession resembles the general educational structure in the community as a whole. In terms of level it covers the spectrum from postgraduate to technician grades. Doctoral work is characterized by the independent nature of the student. He works under some kind of supervision but generally we can assume that he will be working in a subject area that is relatively uninvestigated and at a high intellectual standard. There are very few students of this kind working for a Ph.D. At the Master's degree level there are two groups of students: those who are engaged in formal courses, such as those at Sheffield or City Universities, which comprise a fair element of teaching and some kind of short research project; and secondly there are facilities at these universities for obtaining Master's degree by thesis only on a part-time or full-time basis. At this level we could also consider the Library Association's mature entry scheme which involves attendance at various short courses and written work over a period of time.

The major development in the last few years has been in the provision of the Council for National Academic Awards' first degrees in Librarianship and Information Science. These courses are usually organized in the Polytechnics and vary in content according to the design of the individual department within the institution. In general these courses comprise integrated studies of librarianship and other subjects such as sociology, language; some include options in science and technology. There are two courses specifically designed for the scientific and industrial field: the Leeds and Newcastle Information Science

B.Sc. courses. These are similar though not identical, but unfortunately the Newcastle course is now discontinued through a lack of students.

The professional level is characterized by the two-year full-time Library Association ALA courses which are organized by several of the Polytechnics. These are essentially courses in librarianship theory and methods, with opportunities for the student to choose specialized studies in kinds of library and information sources in specialized fields.

A syllabus which has now been taught for some time but does not receive a great deal of publicity is the City and Guilds Library Assistants' Certificate. This is a part-time basic course in library methods and routines. It is intended to give the student insight and skill in the specialized clerical and semi-professional methods of the library. Also at about this level, although possibly nearer the professional, is the part-time course organized by the Northern Branch of the Institute of Information Scientists in Manchester.

This very brief survey represents the formal educational system but in addition we have an informal short-course organization which pervades all levels of the formal structure. Many of us will have attended Aslib courses; specialized and general. Some of the Polytechnics also organize 3–5-day courses, and generally, if we can assess the response of the students, we judge them to be very successful. There are also the various meetings and conferences which serve an educational purpose.

I shall examine the system in terms of (1) level of course, (2) type of course, (3) numbers, and (4) co-ordination.

(1) Level of course

The missing levels tend to be at the extremes of the professional scale. It is now several years since the Saunders–Schur[1] report recommended that we should have some kind of Staff College organization, a system whereby actual and potential leaders of the profession could undergo various kinds of intensive courses related to the level and scale of their actual operative field in management. We have still not achieved this aim. We do have our national and international conferences where senior executives are brought together in congenial surroundings and there is a valuable exchange of ideas and information but these conferences lack the precision of objectives which a more formal course has. The role of the delegate as far as the main business or theme of the conference is concerned is essentially passive. It may not be necessary to have a building designated as a Staff College, this level of course could be organized through the Polytechnics and Universities.

At the other end of the scale we have the junior courses as typified by the City and Guilds Library Assistants' Certificate, but there appears to be a need for something between this and the professional. I am thinking predominantly of the smaller firm with maybe less than two hundred employees. A firm of this order will probably not have enough information or library work for a full-time worker and yet it still has information problems and acquires various kinds of document in a generally unorganized fashion. The firm may employ some graduates but will almost certainly have holders of National Certificates and Diplomas. A possible solution to this kind of situation is that the professional or technical course should contain a useful amount of information work; sufficient for the worker to be able to understand the problems and methods of information handling and to organize a small-scale system; whilst still practising according to his main qualifications.

(2) Type of course

By type of course I mean full-time, part-time, sandwich, and short course. The missing link appears to be in the field of day-release and evening courses. The missing element is students rather than opportunities for them to study part-time. It is possible to obtain a higher degree by part-time study at City, London, Sheffield, Strathclyde, or Belfast Universities, and in addition I think any university would accept a suitable project along similar lines. Also it is possible for suitably qualified people to obtain an ALA through the Library Association's mature entry scheme or the Diploma of the Institute of Information Scientists by study at the City University. The chief problem is in the provinces and at a slightly lower level than higher degree.

If a mature student in Leeds or Birmingham having less than a first degree, say HND, wishes to obtain a qualification in information work he would find it extremely difficult, largely because there is not a sufficient concentration of students in these areas to justify a college putting on a course. There are possible solutions to these problems, one of which we shall be trying in Leeds in 1973. We shall organize the teaching on our full-time librarianship degree course so that part-time students can be incorporated into the full-time classes.

It would appear that the demand for part-time courses varies in different parts of the country and educational institutions will need to attempt a solution which solves their particular regional problem. Where the demand appears steady then a relatively permanent part-time course can be organized and where the demand is small and sporadic other measures will be needed.

(3) Numbers

In dealing with numbers I am conscious of treading dangerous ground. We tend, quite naturally and rightly, to view the prospects of overproduction of qualified people with a certain amount of trepidation. I suspect that there may be a shortage of people being specially prepared for industry and commerce. In the last two DES surveys[2, 3] about 4 per cent of all students have found employment in industry. If we assume that this is a fairly constant figure and apply it to the numbers at present on our courses, the actual number of 'industrial' students is somewhere between 80 and 120 students, depending on the method of calculation. I should like to see a more precise calculation, because this number seems very small in absolute terms. In conversation with lecturers from other schools my impression is that students who have taken scientific and technical courses or these options in more general courses have least trouble in getting jobs. These impressions are purely subjective and I would not go so far as to say that there is a shortage of students intended for industrial information work, but we do need objective research results urgently.

(4) Co-ordination

In my opening remarks I referred to the apparent lack of formal, co-ordinated development of the educational system. There are three professional bodies concerned with education and training, four if we count ABLS. There are eleven polytechnics and five universities (if we include Dublin) with Departments of Librarianship and/or Information Science. I think that the number of educational institutions providing courses which will enable students to work in the information–library field is likely to grow; for example, I understand North Staffordshire Polytechnic may be running a degree course in information science from September 1972. It would appear therefore that we may be approaching the situation which obtains in other academic fields where every university has its chemistry or history courses. Is this a 'good' or 'harmful' development for us? It is 'good' if it increases the pool of talent from which the profession may draw. It is 'harmful' if it leads to an increasing fractionation of the profession and for this reason I should like to see some slightly more formal co-operation between the professional associations. I am not suggesting a monolithic educational body pontificating on educational matters; this is the path to stagnation. If we wish to pursue major developments such as the provision of Staff College courses or technician-type qualifications then they must have the support of the three bodies concerned, namely Aslib, the Institute of Information Scientists and the Library Association.

REFERENCES

1. SCHUR, H. *and* SAUNDERS, W. L. *Education and training for scientific and technological library and information work*. London: HMSO, 1968.
2. CLEMENTS, D. W. G. Survey of library school students completing courses during December 1969. *LA Record*, **72**, 9, p. 312–16.
3. *Idem*. Survey of students of librarianship and information science completing courses during December 1970. *LA Record*, **73**, 11, p. 207–9.

What educational programme is required to produce the necessary specialists?

2. EDUCATION OF INFORMATION SPECIALISTS FOR THE 1970s

Herbert Schur

Senior Lecturer, Postgraduate School of Librarianship and Information Science, University of Sheffield

Paper presented at an Aslib one-day Symposium on 'Tomorrow's information worker: education and training', London, 21st June 1972

THE PREVIOUS SPEAKERS in this symposium considered in varying detail the questions 'who', 'how', 'where', and 'what', in relation to manpower and its education and training. In this paper I intend to return to the question 'what', and, in particular, to consider four main points, namely:

(1) the field of activity of the information specialist;
(2) the changes likely to occur in this field over the next ten years or so;
(3) the consequential implications for staffing; and
(4) education and training of information specialists and ancillary staffs.

(1) The information specialist

This expression is used in preference to the narrower, and often misunderstood, expressions of 'information scientist', as used by the Institute of Information Scientists in the UK, or the American Society for Information Science in the USA, or 'documentaliste', 'Dokumentar', or 'informatik', as used by the Association Française des Documentalistes et des Bibliothécaires Spécialisés in France, the Verein Deutscher Dokumentare in Germany, and VINITI in the USSR, respectively. The expression 'information specialist' as used in this paper (and in a report[1] on which this paper is partly based) includes all these, and others, and, in particular, is independent of the category of work being carried out, which may range from system operation to background research. The field of activity of the information specialist may be described operationally as that represented by, and in, such publications as the *Annual review of information science and technology, Scientific research in British universities and colleges* (section on 'Information science'), *Journal of documentation, Information storage and retrieval,* and *Journal of ASIS,* and abstracting publications such as the *Referativnyi zhurnal: informatika,* or the *Library and information science abstracts,* together with areas in some neighbouring fields such as in human communication, psychology, and linguistics. In my view, large areas of modern librarianship and areas in data processing are included in the field within the scope of the information specialist.

As should become clearer in the next section, the field of activity of the information specialist is wider than that being covered, at present, by Aslib[2] and is also wider than that of the 'information scientist' as outlined in the publicity material of the Institute of Information Scientist.[3] I would add, that in view of the relatively small membership, and continually increasing costs, some rethinking of the scopes of activity of these institutions may not be premature.

By 'information science' I understand the scientific foundations of the field of work and study of the information specialist, and if some areas of this science are also claimed by others, then the position is no different from that, say, in chemistry, where substantial parts can also be claimed by physicists, and if the existence of an information science is denied, then the position is no different from that taken by some in respect of medical or engineering science.

(2) Changes likely to occur in the field of activity

In planning education and training programmes for information specialists, not only do we need to consider the present range of activities, and as indicated these are potentially far wider than are being catered for by current programmes, but also to consider the changes likely to occur in the field of activity of the information specialist over the next ten years or so, changes which will be the result of changes in *demands* made on information systems and of the consequential changes in their *functions* and *structure*. We also have to take into account the likely consequences of *technological* changes on these and on the techniques likely to be used.

I do not expect that dramatic and sudden changes are likely to occur in the *demands* made on information systems, but the changes which will occur will, because of the structure of the information systems network, be of more than local interest.

The increasing awareness of the importance of the *social component* in planning will result in demand for changes in the information systems serving planners. The main pressures will be for the provision of more accessible, faster, more comprehensive, and more standardized statistical information systems co-ordinated on interdisciplinary and international bases. The systems will be required to operate SDI (Selective Dissemination of Information) services, carry out retrospective searches, and, if required, process the data stored (for example, carry out statistical tests, compute correlations, and carry out various other analyses). The need for complex techno-economic-social analyses will require the linking of some of the existing systems in science, technology, and the social sciences, with the statistical systems. Sub-systems will be required for planners at the local and regional levels.

Specialized *data banks* will increasingly be introduced in a wide variety of institutions and in support of a wide variety of aims, not only for research and development, but also for production, marketing, and other 'service' functions. Examples of such systems are those already serving pharmaceutical research, preventive medicine, crime prevention and detection, ionospheric and weather forecasting, insurance, patent and legal work, local government planning, and mail order store control, to mention just a few of the wide variety. Some of these systems will increasingly be used not only to provide information, but directly to use it to control various operations, particularly in areas where the man-to-machine cost ratio is high and increasing and the reliability ratio is low and decreasing.

The continuing quantitative and qualitative growth of *education* will result in increasing pressure on existing libraries, particularly public libraries, and on the library and information facilities, if any, of educational establishments. In this connection it may be sufficient to mention the developments in the UK in the past decade, or so, which resulted in the upgrading of some Technical Colleges into Colleges of Technology, then Colleges of Advanced Technology, and then to Universities and Polytechnics, with the consequential rise in the demands made on the library and information service facilities. I would expect that with advances in educational technology there will arise a demand for new developments at the interface between various information systems and programmed learning systems.

The expected closer links between the United Kingdom and countries of the European Community will result in increased demands for information generated in these countries. Whilst the English *language* is likely to maintain, and even improve, its position as the medium for communication in some countries of the Community, there are indications that official pressure will be exerted in others to promote the use of the national language. This, together with the increasing importance of Japan in many branches of science, technology, and economics, will lead to an increase in the demand for translation from German, French, and Japanese, and, at a later stage, from Spanish (Latin America) and Chinese. Russian, because of its major position in Comecon countries, will maintain its position as an important foreign language.

The *functions* of information systems will increase in their variety and in their comprehensiveness. As a result of increased co-operation and co-ordination of effort, the development and maintenance of 'matching' sections in the individual systems, that is the sections at the system/system and man/system interfaces, will become of greater importance. The shift of the primary functions will be particularly pronounced at the system/user interface, where a much greater effort than hitherto will have to be devoted to enabling the user to exploit the information system more fully. Ease of access and ease of use will be the primary demands of the user.

The functional changes in academic, large public, and, to a lesser extent, industrial libraries, will lead to a reduction in the differences existing among these, particularly with the greater stress on the provision of information services, and a reduced stress on collection building and archival functions.

The *structure* of information systems and systems networks will change as a result of *economic* pressures, *technological* changes, and *political* decisions.

Economic pressures are already resulting in a closer examination of costs and 'benefits', and in pressure for information services to become partly or fully self-supporting. Structural changes are likely as a consequence of a closer examination of manpower, materials, equipment, and communications costs, and the increasing availability of part- or even fully-processed 'raw material', especially with the new possibilities opened up for further processing as a result of technological changes.

The increasing volume and unit costs of material will lead to changes in acquisition and storage policies, and we may, therefore, expect the further development of a hierarchy of materials back-up schemes, from local to international level.

The share of the 'equipment' component in a systems budget is likely to increase as equipment is acquired for processing of machine-readable records, reprographic requirements, and telecommunications. In growing and expanding systems this will not pose any particularly difficult problems, but in those systems which have reached a budgetary plateau a fundamental reassessment of the functions of the system will become unavoidable.

Technological changes, such as the development of large capacity low-cost direct access machine-readable stores, will promote a rapid growth of computerized data banks and data-based information systems. Records will increasingly be kept in machine-readable form only and will increasingly be read-in directly rather than through the intermediary stage of a written or printed record.

On the other hand, I expect that in the great majority of literature-based information systems, records will continue to be stored and made available in printed form. This material will increasingly be supplemented by material in other physical forms (e.g. microform, magnetic tape), but, except in a few special cases, the proportion of this latter type of material will remain small. Programmed-machine processing will increasingly be used for 'housekeeping' operations, as well as in 'copy' preparation, particularly for material in need of frequent revision.

In the area of computerized information retrieval the technical possibilities will continue to exceed by a large margin the economically justifiable ones. We may, however, expect the growth of 'repackaging' services providing both machine-readable and printed outputs. SDI and one-off searches of recent material will continue to grow in volume, but searches of long runs of natural-language based files will require the solving of difficult software and hardware problems before becoming economically justifiable on a large scale. Large retrospective searches of well-structured data bases, such as those of chemical compounds, should, however, be technically and economically feasible.

The major impact of advanced communications technology will be in the area of high-value, short half-life information, as in data and information systems related to international trade, banking, finance, and news media operations. Improved telecommunications will have a significant impact on the structure of information and data networks, but little effect on the 'affluent scientific commuter' who, as before, will find his physical presence essential for efficient information transfer.

The effect of *political factors* has already been indicated in relation to the impact of the European Community on language problems. A more important impact is likely to be caused by the increasing international collaboration and co-operation with these countries, the free movement of information workers and of students (particularly at the advanced levels). These measures should have a significant impact on the rate of diffusion of modern methods and techniques and of research findings.

(3) Implications for staffing

Given the wide field of activity of the information specialist and the changes likely to occur in this, what kinds of information specialists will be required in the next ten years or so?

In broad terms, we shall require staff to develop, design, and operate information systems which, together, will serve an increasing variety of needs and which, individually and jointly, will aim at providing faster, more comprehensive, easier to obtain and easier to use services for the user. We shall need a flexible and adaptable staff, and, therefore, a broad basic education will be invaluable. Above all, we shall require more men and women of real ability, considerable imagination, sound judgment, and drive, to enter this field so as to advance the theory and practice of information work in its many aspects.

In addition to the career-orientated professional information specialist staff, we shall require specialists from other fields, particularly for work at system interfaces, and for work involving the use of various technical equipment. This specialist staff will need to include subject specialists, computer specialists, industrial liaison officers, translators, and others.

(4) Education and training

In considering the fourth point in this paper, I will only very briefly outline some ideas on planning education and training programmes and refer you to fuller treatments published elsewhere. In planning it is useful to have some framework for placing the individual programme in relation to others. For practical reasons the number of factors which should be taken into account will need to be small, and I believe that three factors may be sufficient. These are:

(i) category of work,
(ii) level of work, and
(iii) major branch or specialization.

We have earlier[4] identified four main *categories of work*, namely,

(i) operation,
(ii) design and development,
(iii) applied research, and
(iv) background research.

With the increasing trend towards a graduate, or graduate equivalent, profession, I believe that only four main *levels* are now required, namely

(i) assistant (technical) (about Ordinary National Certificate plus),
(ii) first professional (about first degree equivalent),
(iii) second professional (second degree equivalent), and
(iv) advanced professional (Ph.D. level).

Finally, considering the breadth of the field of information work, a division into three *branches* may be made, namely:

(i) programmes for specialists to be concerned primarily with natural-language base systems (virtually all the current programmes in the UK are of this type);
(ii) programmes for information specialists to be concerned mainly with

symbol-, graph-, or similar basis systems (e.g. chemical structures, engineering design);
(iii) 'matching section' programmes for specialists in other fields for specialized information systems work (e.g. for computer specialists, subject specialists).

Programmes based on this framework have been described in some detail elsewhere.[5] It should be sufficient here to suggest that the most that should be attempted in any given programme at a given level and for a given branch of work is to cover two adjacent categories, one as the primary objective, the other as the secondary one.

The design and implementation of the programmes will also need to satisfy certain objectives (educational, professional), within given constraints and be examined against certain criteria. But the discussion of this would require another paper.[6]

Conclusion

In my view we should aim at extending the field of activity of the information specialist to areas of information work hitherto largely neglected by professional information workers. The extension of the field of activity will, apart from bringing much needed new ideas and expertise to the solving of problems in these areas, also increase the strength of the profession and discipline, and secure economically, socially, and politically important new areas of activity for the information specialist.

The increase in the field of activities of the information specialist will also stimulate research into a wide range of problems in information science, especially in areas which hitherto have been studied only from the points of view of other sciences, such as psychology, physiology, linguistics, logic, communications, economics, and engineering, to name but a few.

The changes which are expected to occur in this broad field of interests of the information specialist are such as are likely to create a continuing demand for well qualified staff at all levels.

New education and training programmes will be required. The framework for planning these, as outlined in the last section of the paper, provides one approach.

What we now need is some hard thought and work in designing and implementing these programmes.

REFERENCES

1. SCHUR, H. *Education and training of information specialists for the 1970's.* Paris: OECD, January 1972. 114 p. (OECD report: DAS/STINFO/72.9)
2. ASLIB. *The work of Aslib for the year ended December 1971.* London: Aslib, 1972. p. 4–5.
3. INSTITUTE OF INFORMATION SCIENTISTS. *A career in information science.* London: The Institute, n.d., p. 2–3.
4. SCHUR, H. *and* SAUNDERS, W. L. *Education and training for scientific and technological library and information work.* London: HMSO, 1968 (SBN 11 270 071). p. 42–3.
5. *Op. cit.*, see ref. 1, p. 22–63.
6. SCHUR, H. *A systems approach to education and training in information science and technology.* ISLIC International Conference on Information Science, Tel-Aviv 29th August–3rd September 1971, *Proceedings.* Tel-Aviv: National Center of Scientific and Technological Information, 1972. Vol. 2, p. 517–28.

UDC: Revise or relegate?

Proceedings of an Aslib/BSI Symposium to discuss FID's proposal for a new Standard Reference Code and its implications for UDC, London, 6th July 1972

FID'S STANDARD REFERENCE CODE PROJECT AND UDC IMPROVEMENT PROGRAMME

G. A. Lloyd

Head, Classification Department of FID
and Secretary to FID/CCC, The Hague

IT IS always a pleasure to revisit the London scene, even if the occasion is a symposium where one is asked 'to put the case for the FID's new policy for a Standard Reference Code', as if one were Counsel for the Defence in the case of UDC versus SRC. The symposium title seems to reflect disquiet, if not panic, in certain UDC circles as to the FID's intentions, but it is quite misleading if it suggests that the FID, after long years of promoting the UDC, is about to abandon—or even relegate—the system in favour of some new-fangled and insufficiently motivated substitute. It is true that the SRC project has received most of its impetus so far from the FID Central Classification Committee (CCC), which is virtually equated with UDC, and that the small SRC Group was set up by the CCC on the recommendation of the FID's independent UDC Advisory Panel, but this is because the other relevant FID committee—FID/CR (Classification Research)—is essentially a broad study committee, only very few of whose members could be expected to work on the project, however interested they may be. In the FID Classification Department itself, which is mainly responsible for UDC revision but very much concerned with all indexing languages and their use in libraries and other information transfer or exchange systems, we have long been sensitive to the criticisms directed against the UDC and most other general classifications, which have partly led to the proliferation of special classifications and thesauri, and we have followed closely the trends towards combined use of thesauri with UDC or other classifications, as well as the still vaguely expressed needs of such projects as UNISIST for some simpler sort of standard referral scheme as a 'macro-switching' device. These considerations have convinced us that both an improved UDC and a simpler, more balanced SRC are needed by the information community, and that each can play its own distinctive role: the UDC for detailed subject retrieval in traditional libraries or documentation centres; the SRC as a simpler means for linking or switching between relatively broad subject-fields in major information exchange systems, such as that envisaged by Unesco and ICSU in their UNISIST project.

Yet the first intimation of FID support for a new referral code is being misinterpreted among some UDC interests as a relegation—if not abandonment—of the UDC on the part of the FID! In British UDC circles especially—witness the recent article in the April issue of *Aslib Proceedings* by the chairman of the

BSI's National Committee for the UDC—there seem to be widespread misconceptions of the SRC project and its expected consequences for the UDC and its users. If these are partly due to the speed with which the SRC project has gathered way or to insufficient publication of its motivation and aims, this paper may be of some help, though it cannot of course present more than a very general picture. Misunderstandings are often unavoidable and informed criticism—even if destructive—can be healthily corrective, but fears for the future of the UDC, at least for the next decade or so, and for the fate of the BSI's good work on the English full edition are not well founded and should not be allowed to cloud the judgment on a vital issue like the FID's new SRC project.

SRC and UDC: peaceful coexistence?

With at least two excellent protagonists of UDC evolutionary development contributing to this symposium, it is not for me here to dwell on its advantages, though I have tried to do so—as best I could—for many years and in many quarters, and shall continue to do so until there is available a proven and better general indexing language for detailed subject retrieval. The UDC, like its parent Dewey DC, has been—and still is—a valuable tool, and the SRC cannot within a decade or two, whatever the hopes of some of its advocates, wholly supplant such a widely used system, with perhaps 100,000 or more users. The construction of even a medium-length SRC schedule of, say, 30,000–40,000 numbers would indeed be an Olympian task, requiring a far larger team than could be funded by FID, though the work might be enormously reduced by the judicious use of the many sound parts of UDC in reconstruction.

Nevertheless, the construction of a synoptic SRC outline of some five thousand subject fields, arranged in a more helpful conceptual order than UDC, and with a more balanced notation reflecting our twentieth-century output of scientific and technical literature, is a project which the FID Council and FID/CCC believe worth pursuing—at least until found uneconomic or impracticable—for several reasons:

(a) The UDC, despite its wide and hallowed use throughout the world, has recently been increasingly rejected because of its nineteenth-century conceptual structure, unbalanced and complex notation and general unwieldiness by such major information systems as INIS, IFIS and AGRIS, and cannot be accepted by UNISIST without a drastic revision that would take at least ten years to complete and might even then make confusion worse confounded.

(b) Even in UDC circles, there is a growing realization of the limitations of the present schedules and the need for really drastic changes and, above all, simplification. But to modernize the existing UDC schedules sufficiently to meet the requirements of current-user and ex-user critics, as well as of UNISIST and similar major information systems of the future, would be to transform them beyond all recognition and to create virtually a new general classification—NuDC, as it were—which could only be done step by step, beginning with something not unlike the proposed SRC.

(c) The results of the SRC project, whether acceptable or not to UNISIST and the like, or to dissatisfied documentalists (UDC users and non-users alike), could furnish a pattern or model for any future improvement of the UDC, evolutionary or otherwise.

All this does not mean that the FID is relegating the UDC, or intending to soft-pedal on normal revision procedure. Quite the contrary! The FID Classification Department, though still understaffed, has recently been increased to three, with two capable assistants under the Head, while the nine-man CCC Executive Group is now holding five or six two-day meetings per year by way of helping the Classification Department to vet and process the ever-increasing number of new proposals for *P-notes* and *Extensions and Corrections to the UDC*. Moreover, the score or more of UDC revision committees FID/C . . . are stepping up their activities or being activated where they have been dormant.

A welcome new feature of the UDC revision scene is the move on the part of the Life Sciences Committees (FID/C 57/59 Biological sciences, C 61 Medicine and C 63 Agriculture) to form a joint steering committee and to hold in November a joint meeting to consider how best to distribute and develop their subjects in the long-free class 4; similar action in the Humanities and Social Sciences may be expected soon. This type of co-operation will certainly help to improve the overall organization of UDC revision, though it will not necessarily make for speedier procedure, which depends essentially on better liaison between the two parties concerned, namely:

(a) The UDC revision committees themselves (FID/C . . .), where the need is for maximum co-operation between their secretariats (nationally based) and the experts in their own and other countries executing specific revision projects, followed by swift consideration in committee, approval and prompt submission to the FID Classification Department in The Hague: recently FID/C 54+66 Chemistry and Chemical Technology, with its British chairman and BSI secretariat, has been a model in this respect, and it is hoped that other FID/C . . . committees will work as productively in the future.

(b) The FID Classification Department, whose task of processing UDC revision proposals received from the international revision committees (and individuals) could be alleviated if better revision principles and directives were available—most essential indeed, as Derek Newcombe and Roland Smith both stress, though hardly a substitute for radical improvements to the structure and notation of the UDC.

UDC mechanization studies and projects, which reached a peak during 1967–70 (1968 Copenhagen and 1970 Frankfurt seminars) following the pioneering work of Rigby, Freeman and others, have also been implemented in operational systems, e.g. by Hindson at the British Steel Corporation, and further such developments may be expected.

Equally important for the information community at large is the FID's concern for thesaurus/classification relationships, which has resulted in a number of papers at recent seminars or symposia, for example in Herceg Novi, Yugoslavia in June 1971, and in practical concordance projects, the most ambitious being a current project for concordance between the UDC and the EJC/TEST

(Thesaurus of Engineering and Scientific Terms). A pilot study with some 180–200 terms (about 1 per cent of the total number in TEST) has shown that 70–80 per cent of the descriptors can be UDC-coded, even on the basis of Medium editions, but that some of the more recently appearing and general disciplines like Fluidics, Environmental Control, Nuclear and Solid State Sciences need two, three or more UDC numbers to denote adequately their scope—a problem that will also have to be faced in the SRC.

If all these activities associated with the UDC can be successfully co-ordinated and a more efficient organization of UDC revision developed—of course with more FID staff and funds made available—then the system may well remain viable for many a year. Mechanization and combined use of thesauri with the classification must, however, also be tested with the SRC, so that a comparison can be made to reveal the pros and cons of both schemes. The fact that the UDC has already proved itself to some extent in both these modes of use must not deter the FID from exploring more radical possibilities for an even better answer, if one can be found.

Motivation and aims of the SRC

From what has already been said, it is clear that two main factors—with two corresponding currents of thought in FID—are motivating the work on the SRC project:

(1) The assumed need of UNISIST for a Broad System of Ordering, which it is hoped the SRC can eventually fulfil, perhaps with non-FID funding later.

(2) The desire of many UDC users—and maybe some non-users—for a reformed UDC even if it means virtually a new international decimal classification, for which it is hoped the SRC will ultimately provide the 'roof' or superstructure.

Although the first is still only a vaguely expressed requirement, the FID Council and CCC have taken note of the findings in the comprehensive report by Vickery *et al.* to UNISIST and deemed it best to seize the initiative—fortified by a recommendation from the UDC Advisory Panel, whose chairman was a member of the UNISIST Central Committee and is the chairman of this symposium. The second factor, despite the firm conviction of some of us that UDC can remain viable given drastic treatment and more efficient organization, is for many the main motivation for the SRC, which is seen as the last hope of rescuing the soul of the UDC, if not its ageing body! Whether UNISIST can or cannot eventually accept as its Broad System of Ordering something like the SRC, the project results will, it is hoped, provide useful ideas for future reconstruction and improvement of the UDC.

That the SRC is an ambitious undertaking cannot be denied: indeed it might seem somewhat presumptuous on the part of a small group of FID enthusiasts to rush in where the more learned London CRG angels are still probing after long years of search for a general faceted classification. But the SRC target is rather more modest, and the Group is relying for its basic inventory very much on the UDC and, for its arrangement of subject-fields largely on the ideas of Bliss, Ranganathan, the CRG and other classification pioneers.

The SRC is envisaged as a synoptic chart or schedule of the whole complex of present-day knowledge, displaying the main subject-fields in a more balanced array than in the UDC and with a simpler maximum 4-figure notation, which could serve to distinguish it from orthodox UDC notation. Under each of these broad 'search fields' it is proposed to list any thesauri, special or general classifications (including the UDC section concerned) that are available for detailed indexing and retrieval. The SRC cannot, with this simple structure, be a depth indexing/retrieval tool, but can serve as a sort of standard grid, with code numbers for all the main search fields of knowledge. The primary role of SRC would thus be as a block or 'macro' switching device for achieving a certain degree of compatibility between the diverse indexing languages used by different information systems, centres or services: success would of course depend on its general adoption (e.g. by UNISIST, or even ISO as an international standard), but clearly the chances of adoption would be greater for a simple 4-figure code than for the more complex general schemes like UDC. This switching role would be especially valuable in systems whose information exchanges or transfers are across language barriers or astride multidisciplinary interests: it is often underestimated in more advanced countries where English, for instance, is accepted lingua franca of descriptor lists and directories. Secondary functions of the SRC might be as standard structuring aid for thesaurus construction, as a simple classified directory to available indexing languages in specific fields, and even—though this is not the intention—as a concise standard filing or shelving code for smaller collections, extensible if needed by coupling to relevant UDC sections, special classifications, etc. The exact mode of coupling from SRC field code numbers to UDC and other detailed indexing languages has yet to be studied, but there is a strong feeling that the UDC could be given priority treatment by simply allowing the SRC 'roof' codings to replace initial UDC numbers, e.g. 43 instead of 621.3, in which case the same topic could have both an orthodox UDC number and an 'SRC/UDC' coding. In any case, whatever the fate of the SRC as a practical scheme, results of the project should focus attention on the good and bad features of the UDC—and indeed of other general classifications, and so stimulate efforts at substantial improvement, which has proceeded too haphazardly in the past.

At this still very early stage of the project, it is hardly possible to foresee more precisely—as many seem to expect—exactly how and where the SRC will eventually be applied, whether and how it will fulfil the main aims stated, and what its final structure and notation will be like. Nor is it reasonable for overhasty critics to expect at the outset a full and clearcut statement of structural and notational principles since, although some basic classification theory must obviously guide the practical designing, the feedback from a gradual elaboration of the outline schedule will inevitably necessitate modification of those principles, so that a year or two must elapse before the arrangement of subjects is at all satisfactorily completed, submitted for wide comment, and perhaps altered accordingly. Nevertheless, it may be of interest to indicate the general lines along which the SRC Group has been thinking and working during the first half of this year.

Possible structure and notation for the SRC

For the SRC structure to cope with the estimated five thousand or so subject-fields and leave plenty of expansion room in its 4-figure code, it has seemed desirable to establish two hierarchic three-level schedules, each with 2-, 3- and 4-figure notations:

(a) Disciplines or branches of knowledge (studies and sciences, techniques and activities) arrayed in superclasses 00/99, classes 000/999 and subclasses 0000/9999.

(b) Object entities, associable with all or many disciplines in (a)—again in superclasses (00/99), classes (000/999) and subclasses (0000/9999), the parentheses serving as clear designations of the object entities whether cited before or after the disciplines in combined codings.

Although the Object entities may well be arranged according to integrative levels in order of increasing complexity, a similar order for the Disciplines, where pragmatic considerations are paramount, seems hardly feasible.

The following highly condensed table shows one possible array of the two

(a) DISCIPLINES OF KNOWLEDGE	
Fundamentals and formal sciences	*00/19 = 20%*
Philosophy. Logic. Methodology	
Maths and paramath. sciences	
Cybernetics and information theory	
Information/data processing	
Documentation	
Science and technology	*20/69 = 50%*
Nat , physical and life sciences	20/39 = 20%
Physics, chem., earth/space	20/29
Life sci., medicine, agriculture	30/39
Technology, engineering, manufacture	40/69 = 30%
Energy and power, engng	40/49
Materials manufacturing	50/59
Human needs, services, etc.	60/69
Humanities, arts and social sciences	*70/99 = 30%*
Arts and crafts. Literature	70/79
Behavioural and social sciences	80/99
Religion	
Linguistics, psychology, education	
Sociology, politics, economics	
Management, admin. and welfare	
History	

(b) OBJECT ENTITIES	
Fundamental and formal entities	(00/19)
Basic concepts: time, space, etc.	
Figures, dimensions, forms	
Data and information (kinds)	
Documents, information-carriers	
Energy and matter entities	(20/39)
Inanimate matter: particles, elements, materials	(20/29)
Living matter: cells, tissues, organisms	(30/39)
Products, natural and artificial; machines and structures	(40/49)
Persons (individual)	(50/59)
Organizations, institutions	(60/69)
Nations, peoples, races	(70/79)
Languages, cultures, etc.	(80/89)
Countries, regions, etc.	(90/99)

schedules in very broad clusters, with the Discipline notations allocated according to estimated percentage ratios of our contemporary literature and information output and the Object entities in equally broad clusters. It should be stressed, however, that the clustering need not eventually be in decads 00/09, 10/19, etc., as here set out: the final distribution has yet to be worked out. Moreover, there are other possible orders, from which the final choice can be made.

SRC work programme and prospects

Since the SRC project is very much in its initial stages, it must be clear that the programme and future prospects are still rather flexible and that current ideas and developments may well be modified considerably before a reasonably satisfactory scheme can be achieved.

The Central SRC Group which has only this year plunged with such enthusiasm into the new project is a small six-man team, appointed (with power to co-opt) at the FID/CCC Warsaw meeting in October 1971. It has been, is and will be a small group precisely because the project in these initial stages is largely experimental, and it seems better that the FID should not have to deploy too much time, labour and money until the basic principles, conceptual structure and notation are more firmly established. Enthusiasm, though essential, must of course be supplemented by adequate funds and sufficient technical expertise, and these the FID can certainly provide for a year or two, so long as the Group remains compact and can show steady progress in the right direction.

Assuming that things go reasonably according to plan, it is expected that a first progress report, accompanied by an outline draft schedule (to 3-figure level at least) will be available widely at the end of this year for information and comment. By December 1973, all comments received should have been processed and incorporated in a more detailed schedule to accompany the 2nd progress report, so that a draft of the full version should be a possibility by the end of 1974.

Such a programme will depend very much for its success on the help obtainable from individual experts and FID/C . . . committees, some of whom it is hoped will augment their normal UDC revision activities by appointing individuals or groups to assist the central SRC team, though it is no part of their terms of reference to do so if they remain unconvinced of the advantages of the SRC.

If the SRC is later developed beyond the simple 4-figure twin-schedule code sufficient for macro-switching within and between multilingual and multidisciplinary information systems, an obvious method will be to incorporate detailed schedules from other sources, especially the UDC. There may then be a period of years when the classification we still recognize as the UDC will vie with the new SRC-transformed scheme, just as the UDC for so long vied with its parent Dewey DC. Sooner or later, however, there must come a mutation in the evolutionary development when even the most faithful adherents of UDC will decide—unless they propose to abandon general classification in favour of a thesaurus, special classification or no classification at all—to adopt a more modern superstructure of the SRC kind, especially if the change-over is made relatively smooth and painless.

Meanwhile, work on the SRC—or if need be, some still better alternative—

cannot be delayed, for time now counts as the world's information output (and correspondingly the need for a modern, internationally acceptable, unifying language) rapidly increases. We must work democratically enough to achieve some consensus in favour of our scheme, but faster than the hyperdemocratic revision procedure for UDC allows. This symposium is the first major opportunity to discuss the vital problem facing us: there will be a second important open forum on SRC and UDC during the FID Conference in Budapest in September, and it is hoped that many others will be held in different countries during the coming years.

Such exchanges can teach us much, encourage or curb excessive enthusiasm: I know I shall leave this symposium a wiser, if sadder, man, and I hope that this contribution—for all its vagaries—has generated in some of you a positive interest in the FID's new policy for the SRC.

SRC: UNVERIFIED ASSUMPTIONS

D. Newcombe

British Standards Institution

SUMMARY

THE SPEAKER explained that the stimulus for the SRC proposal came partially from the UNISIST study report in which the working group responsible for subject specification had drawn attention to the need for better tools for the control and conversion of information retrieval languages, such as UDC and to the need for further study and experiments. The working group had already considered a study undertaken at their request by a team from the Aslib Research Department[1] under Mr B. C. Vickery in which, however, only the *term content* of different schemes, mainly in the English language and including UDC, were compared. When this investigation was carried out in 1969, only twenty of the expected one hundred parts of the English Full edition were available, whereas now there are eighty. Even so, UDC was less defective (including over 80 per cent) in content of terms than the other major general schemes of classification studied, i.e. BC, CC and DDC. The study also included a comparison between the classificatory relations used in some major thesauri, i.e. the EJC/TEST, NLM/MeSH and EURATOM thesaurus, with those used in the general classifications already mentioned. As far as UDC was concerned, this did not compare as favourably as more recent studies by Kara,[2] Öhman and Olivecrona,[2] and Stueart,[3] and Wellisch.[2] This was partly because the Aslib study did not take into account the well-known synthetic characteristics of UDC, i.e. the use of colon combinations and of common and special auxiliary subdivisions. He maintained that FID should not have embarked upon a programme of radical revision based upon the proposals for an SRC (see *Aslib Proc.,* Vol. 24, no. 4, April 1972, p. 222–5) because:

(1) Insufficient time had been allowed, between the date of issue of the document announcing the SRC proposals to members of FID/CCC and the date of the meeting in Warsaw at which they were to be discussed, for the representatives of publishers and users of UDC to properly obtain national opinion and to reach a duly considered decision.

(2) At the meeting of FID/CCC in Warsaw in October 1971, only half the members were present when it was decided by a majority vote of eight to two (with the British member abstaining) that an attempt should be made to elaborate an SRC, ostensibly based on UDC structure and notation.

(3) FID national members and national and international UDC committees had been asked to co-operate without first being asked whether they believed the objective of such a proposal was desirable.

(4) The need for such a scheme had not been sufficiently established and no coherent (i.e. with closely-linked members) or authoritative national or international body had yet stated categorically that the existing UDC is totally unsatisfactory for use internationally as a meta-language for the exchange of information between retrieval systems using different and often incompatible indexing languages (both natural and artificial).

(5) FID did not really have the resources to elaborate and maintain such a scheme, and at the same time maintain its service to existing UDC users. In any case, if such a scheme was desirable, the general index language upon which the British Classification Research Group[12] had been working for many years would be a very strong contender for use in an international information network such as that proposed for UNISIST, even though the requirements for the latter had not yet been clearly formulated.

Unfortunately, there seemed to be considerable ignorance of the recent applications of UDC[4-9] and of the principles of classification theory and research, modern or otherwise, both by existing users and the authors of proposals for the revision of UDC, as well by those not using it or familiar with it. This was supported by H. Wellisch in a recent article.[10] The speaker's own experience led him to believe that certainly existing users were more dissatisfied with the 'internal' structure of the scheme than with the grouping and sequence of main classes, even though by present-day conceptions they were not ideal. He was convinced that the provision of more detailed rules for revision of the schedules than those in the existing publication[11] with systematic and consistent principles for the recognition and application of characteristics of division within basic (main) classes and awareness of the relation between schedule or filing order and citation or combination order were more important than improvement in the management of the scheme. Although the latter could be improved by the use of automatic data-processing equipment at the FID General Secretariat, as had been demonstrated by the experiments conducted by AIP,[4] with the English editions as the data base and rigorous adherence to revised rules of procedure for the submission of revision proposals, it was still necessary for those preparing such proposals to have more knowledge of the principles of classification in general and their application to UDC. Wellisch[10] had suggested the enlargement of the Classification Department at FID General Secretariat and the transfer to it of responsibility for editions in particular languages but the speaker doubted whether the bodies at present responsible for them would readily relinquish their staff for that purpose. Wellisch also maintained that a medium edition in English would satisfy the requirements of most users but the British UDC committee preferred to give priority to the completion of the English Full edition before preparing a medium edition.

The speaker drew attention to the alarming increase in the number of users of the Library of Congress Classification in those libraries using English as an indexing language, even to the detriment of the DDC and despite its unsatisfactory structure,[13-15] because it is associated with a centralized cataloguing agency. To counteract this tendency he hoped that the UK MARC scheme would include provision for UDC as well as DDC, with the former used for highly specific subject indexing and the latter mainly for shelf location and arrangement. However, he thought it was a pity that there was not greater co-operation between those responsible for UDC and DDC and pointed out that although UDC was diverging more and more from DDC, the latter was now adopting more of the characteristics of UDC, such as the provision in the new 18th edition of tables for concepts which closely correspond to those included in the tables of common auxiliary subdivisions of UDC.

Since the most expertise and experience with different classification schemes and with the principles and practice of modern classification seemed to be concentrated in Great Britain, he suggested the formation of a group in this country to advise the British UDC committee upon the course of action to be taken and to elaborate the rules for the revision of the schedules, in close collaboration with FID/CCC and its associated committees. Much of the information to be considered for this was available in the eighty-one references listed at the end of the preprint of his paper.

REFERENCES

1. ASLIB RESEARCH DEPARTMENT. *Classification in science information.* A comparative study undertaken by Aslib for the International Council of Scientific Unions. London, June 1969. Presented as document UNISIST/CSI/5.8 at 4th session of the central committee to study the feasibility of a world science information system, held at UNESCO House, Paris, 15–17 December 1969.
2. YUGOSLAV CENTRE FOR TECHNICAL AND SCIENTIFIC DOCUMENTATION. Proceedings of the International symposium 'UDC in relation to other indexing languages', held in Herceg Novi, Yugoslavia, 28th June–1st July 1971. Beograd and The Hague 1972. [Includes the following important papers:

   COOKE, J. A. HEAPS, D. *and* MERCIER, M. The study of UDC and other indexing languages through computer manipulation of machine-readable data bases.

   KARA, A. (formerly MAROSI, A.). The relation of the UDC to the Euratom thesaurus from the point of view of the small information centre.

   NEELAMEGHAN, A. A theoretical foundation for UDC: its need and formulation.

   ÖHMAN, E. *and* OLIVECRONA, C. Some notational hierarchic, and syntactic problems in connection with concordances between UDC and thesauri.

   PERREAULT, J. M. The concept 'main class' and its implication for structural improvement of UDC.

   RIGBY, M. An inverted UDC index as a step toward simplified and effective thesaurus deveolpment and maintenance.

   SCIBOR, E. Some remarks on the comparative efficiency of UDC and descriptor languages.

   WELLISCH, H. A concordance between UDC and TEST: results of a pilot project.]

3. STUEART, R. D. Analysis of the Universal Decimal Classification as a term system for nuclear science and technology. *Library resources and technical services*, **15**, 3, Summer, 1971, p. 399–411.
4. FREEMAN, R. R. *and* ATHERTON, P. *Final report of the research project for the evaluation of the UDC as the indexing language for a mechanized reference retrieval system.* American Institute of Physics, UDC project report No. AIP/UDC-9 1968.
5. CALESS, T. W. *and others. Strategies for manipulating Universal Decimal Classification relationships for computer retrieval.* Final report, December 1970 (includes articles by A. C. Foskett, D. Langridge, J. Mills and J. M. Perreault).
6. INTERNATIONAL FEDERATION FOR DOCUMENTATION (FID). Committee on classification research. FID/CR Report No. 9. *Proceedings of first seminar on UDC in a mechanized retrieval system,* conducted by R. R. Freeman and Pauline Atherton, Copenhagen, 2nd–6th September 1968. Edited by R. Molgaard-Hansen and Malcolm Rigby. Copenhagen, 1969. [Includes the following papers:
   LLOYD, G. A. An FID viewpoint on the role of UDC in a world science information system (keynote address on behalf of the FID).
   DE REGT, W. F. The use of UDC as an indexing language in computer-based information retrieval systems.
   RIGBY, MALCOLM. Selection and dissemination of information using UDC in International Information Networks.]
7. FID Committee on classification research. FID/CR Report No 11. *Proceedings of second seminar on UDC and mechanized information systems,* conducted by R. R. Freeman, Frankfurt 1st–5th June 1970. Edited by R. Molgaard-Hansen and Margit Westring-Nielsen. Copenhagen, 1971. [Includes the following papers:
   SCIBOR, E. Some remarks on the future development of UDC for the viewpoint of mechanized information retrieval.
   RIGBY, M. The role of the UDC in automated information and data systems (as 1985).]
8. MCCASH, W. H. *and* CARMICHAEL, J. J. UDC user profiles as developed for a computer-based SDI service in the Iron and Steel Industry. *Journal of Documentation* **26**, 4, December 1970, p. 295–312.
9. RIGBY, M. Computers and the UDC: a decade of progress 1960–1970. Presented at 35th FID Congress, Buenos Aires, 14th–24th September 1970 and to be published shortly in revised form by the FID Committee for Classification Research (FID/CR).
10. WELLISCH, H. Reorganization of the UDC. [Translation of an article which appeared in *Nachrichten fur Dokumentation,* **22**, 2, April 1971, p. 55–63, which is referred to in 'The FID policy for the UDC' by J. E. Wright, *Aslib Proceedings* **24**, 4, April 1972, p. 215–62. This translation may be obtained free of charge from BSI as document 72/80152.]
11. INTERNATIONAL FEDERATION FOR DOCUMENTATION. *UDC revision and publication procedure.* The Hague, 1968 (FID Publication No 429).
12. FOSKETT, D. J. *Classification for a general index language. A review of recent research by the Classification Research Group.* Library Association Research Publication No. 2 1970.
13. DAVISON, K. *Classification practice in Britain: report on a survey of classification opinion and practice in Great Britain, with particular reference to the Dewey Decimal Classification.* Library Association, 1966.
14. FRIEDMAN, J. *and* JEFFREYS, A. Cataloguing and classification in British University Libraries: a survey of practices and procedures. *Journal of Documentation,* **23**, 3, September 1967, p. 224–46.
15. MILLS, J. Progress in documentation: library classification. *Journal of Documentation,* **26**, 2, June 1970, p. 120–60.

WHAT IS REALLY WRONG WITH THE UDC?

J. Roland Smith

Chief of Library and Information Services,
UKAEA, Risley

SUMMARY

THE RIGHT PEOPLE to say what was wrong with the UDC were the users of the UDC. They had invested in it. Now the FID had authorized preparation of the Standard Reference Code, one of the intentions of which was to be the future framework of a more balanced and logically-constructed 'UDC'. But would it correct the defects of the present UDC? The purpose of the present paper was to put forward the views of five practising librarians on what were the most serious of those defects, and to try to see whether the SRC was likely to remedy them.

After disregarding all views not put forward by three or more librarians, the speaker had arrived at the following, in the order cited, as the most significant criticisms:

The updating and revision mechanism is inefficient

Lack of a strong UDC editing body able to make decisions; and of rapid and efficient means of notifying those decisions to users (*not* through the present *Extensions and Corrections*) were the complaints. In the speaker's view, the SRC planners had so far ignored them.

Many schedules are largely out-of-date

Examples were quoted, and the remedy was, of course, revision—for some, radical; but for most, evolutionary. Any major reconstruction would nevertheless not remain valid for long. Some faults could be corrected by proper relative indexing in libraries. The speaker acknowledged that, obviously, the SRC ought to solve this problem—but was it necessary? Existing libraries would be unable to abandon UDC in its favour because it would be so different. And there were no signs that future revision procedure for SRC would be any better than that for UDC. Was it intended to cease publishing UDC? If not, how could two different systems be sustained?

Insufficient guidance is given in the schedules

Comments, explanations, scope notes would help considerably in interpreting the schedules. Some would appreciate more indications of preferred order when using the colon. The speaker, however, doubted whether the present expert Panels always appreciated the need for guidance. A strong UDC editorial office with wider views should undertake this. Unless this were done, SRC would be likely to suffer from the same defect.

A complete English edition is lacking

Librarians commented on this with weary resignation rather than indignation. But, the speaker pointed out that the whole voluntary system for preparation

of UDC editions was to blame: the remedy was a full-time managing Editorial Office. SRC was likely to be based on the same system as the present UDC.

Comments on the SRC

Although not asked to, three librarians criticized the concept of the SRC, and forecast that it would seriously affect existing UDC users.

Conclusions

The majority view seemed to be that what was wrong with the UDC could be put right; it was not necessary to start a new scheme. The speaker put it to the meeting that they should now consider some positive proposals to reform the *management* of the UDC. In his view, that was where things had really gone wrong. He appended to the preprint of this paper a summary of Hans Wellisch's 'Reorganisation of the UDC', of which translated copies had been distributed to participants by BSI.

CONCLUSIONS

A. C. Foskett

College of Librarianship Wales

THE DISCUSSION may be summed up under four headings, only one of which is classification; the other three are Politics, Finance and Management. We may begin with Politics, for many of the problems have their basis in politics. There is a sense of dissatisfaction with UDC among a number of important people: important, that is, in the sense that their views carry weight in international circles. In 1948 the Royal Society's Scientific Information Conference came to the conclusion (as a similar meeting did in 1896 in relation to Dewey's classification) that there was no satisfactory classification for science and technology, and that they would easily solve the problem by devoting a little thought to it; we are still awaiting their results. The UNISIST meetings were again largely meetings of scientists; Dr Coblans has assured us that they did not in fact come to any definite conclusions, but one gets the feeling that many of those present did not favour UDC. There is already some feeling—stemming I believe largely from ignorance—in the United States that UDC is not the scheme they are looking for; very few libraries there use it, and there is no guarantee that it would become popular even if the full English edition became available. The Eastern Europeans use UDC, but would they welcome the suggestion that the English edition should become the key edition?

Is there a clash between UDC and the Standard Reference Code (SRC)? If there is, it is almost certainly a clash of finance, rather than classification or politics or management. UNISIST have not allocated any funds to the further study of the SRC they claim is necessary for their purposes. FID has never had enough money to finance UDC as it should have been financed. Mr Lloyd has never had adequate (or indeed for most of the time *any*) staff; the staff at BSI was trebled a few years ago by appointing two extra assistants. Can we still expect satisfactory results in this day and age from a system which relies so heavily on voluntary effort? At present, if voluntary effort is not forthcoming work on UDC dries up; that is why it *has* dried up completely in some areas. There are no longer enough people who are willing to devote their time to UDC for no return. Money is needed; how much is not clear. The figure of £2,000,000 was suggested, and this would probably be adequate; however, if we consider other systems such as MEDLARS, which cost $3,000,000 to get started ten years ago, perhaps £2,000,000 does not sound as ambitious as one might think. The SRC, it is claimed, requires a much smaller effort than this; a small team (we are not told how small) working for some five years. We might be reminded of the Classification Research Group, which has been working on a similar project for some ten years without achieving anything definitive. The Decimal Classification Division in the Library of Congress employs fifteen people; half of them work on the development of the classification, the other half on actually classifying the throughput of books; yet DC is not contemplating the kind of radical change that is proposed here. A major cause of the unease that has been expressed, and which has led to this meeting, is the worry that funds and effort diverted *to* SRC will be diverted *from* UDC. Unless more money absolutely is to be made available, something has to go. But it is not a good time to start trying to find large-scale funds for this kind of objective; in this country, we are not accustomed to thinking in terms of sums of the order required, while in the United States there are no longer the funds available for research in library science that were flowing freely five years ago.

If we turn to Management, we are led to wonder whether all our present problems would have been avoided if the Full English edition had been available. Would the Americans have found it necessary to develop the COSATI categories and the EJC Thesaurus? Are they so very different from UDC that the effort devoted to them was well spent? I rather doubt this, though the Americans do tend to prefer their own products. But of course the Full English edition is *not* available. It has been 'about to be finished by the end of next year' since 1965 at least, to my own knowledge as a member of the British committee. This year it does look as though it will be complete, though some sections are thirty years or more out of date.

This introduces the whole question of the revision mechanism for UDC, well described by Mr Lloyd as 'hyperdemocratic'. We are so anxious to make sure that everybody is satisfied that eventually nobody is satisfied. During the discussion session Mr Griffin asked: 'Is UDC constantly up-dated?' and gave his own reply: 'No!' The effort required for updating, whether voluntary or professional, is not available; where is the effort to develop SRC to come from if insufficient effort is available for current work? To what extent are users of UDC prepared to make the effort available?

What are the objectives of SRC? There seems to be a feeling that change is needed in UDC; are we going to get it? Is SRC a way of getting change in UDC via the back door, so to speak? If so, is that good or bad? It is the users of UDC who must make their views clear, because they are the people who are going to be most affected by any changes. I cannot myself see that if SRC is developed UDC 1 (i.e. UDC in its present form) can continue, but then UDC 1 has been very heavily criticized already. As I have said, if the Full English edition had been available, probably none of this discussion would have been necessary; but we do not have the Full edition, and the reasons which have led to that situation are not going to change overnight, whether we have SRC or not.

Finally, under the heading Classification, we have a classic case of the conflict between stability for users and the growth of knowledge. There *is* a conflict; it is a very real one, and there is no way of resolving it. Every time we classify a document we are investing in obsolescence, and we are not going to want to change that classification next year, or even in a few years' time. There has to be stability in a classification scheme for it to be acceptable to any large body of users. But stability must be limited; in a field which changes radically within the space of ten years, fifty years of stability is a handicap, not a sheet anchor. We must come to terms with the fact that there is a need for regular change; as was pointed out in the Reith lectures, the pace of change is speeding up. If we do not recognize this fact, then we shall lose the people who actually use UDC: the people who use, rather than construct, our catalogues and indexes and libraries. This is part of the trouble; it is the reason why scientists in bodies such as UNISIST have been seeking something new. Of course the same thing will happen to SRC as well; in ten years it will begin to look outdated, though its generality will give it more stability than the great detail of UDC.

How general will SRC be? It has been suggested that it should contain 4,000–5,000 subject search fields. The Abridged UDC contains about 12,000, and this is regarded by some people as quite a detailed scheme. Has this point been adequately explored?

Will SRC be of value to information centres? We have been told that it will not by one speaker; but neither is UDC according to others. There is no doubt that UDC's cumbersome notation is a handicap; are we to devote a lot of effort and money to something which is just too old to be repaired? Where does the weakness of UDC lie? Is it in its overall structure, or in its detailed working out? The answer to this question might help us to decide what to do.

The proposal for SRC arose from a dissatisfaction with UDC as it stands at present. I am not sure that SRC is the right answer, but an answer must be found, and the people who are going to have to find it are the people who use UDC in their libraries. If this afternoon has stimulated people to think about this, and better still to try and do something about it, then I think it will have achieved its objective.

Letter to the Editor

SWITCHING LANGUAGES

Dear Sir,

I have only recently had the opportunity to see the article by Alan Gilchrist in your July issue. In his discussion of Switching Languages, I feel that there is one major omission.

This is the use of computer-based thesaurus management systems (such as that of the National Computing Centre) to perform the switching function between both monolingual thesauri and glossaries and bi- or multilingual thesauri or glossaries. Such a system could also be used for the preparation of multilingual editions of classification schemes, e.g. UDC. Additionally the thesauri produced by NCC's Thesaurus Management System can also be used as they stand, for document indexing by different language groups where these are co-operating in IR systems.

The key to this great flexibility is the fact that each term within the thesaurus is allotted a sequential accession number, and these numbers are used for indexing. This has the advantages, both in the Management System and an associated IR system, of more accurate input, faster input and easier computer handling.

As an example within the computer field, the term 'Magnetic tape' has been given the thesaurus number 2731. We can thus code other languages in their own thesauri as follows:

2731	Magnetic tape	(English)
2731	Magnetband	(German)
2731	Bande Magnetique	(French)
	etc.	

The relationships between this and other terms will remain the same.

The output will be three thesauri in the required versions (numeric, alphabetic or hierarchical) with each language containing only its unique terms but linked to the others by means of the thesaurus numbers.

When indexing is carried out in, say, France, then only the number 2731 need be input. Thus there need be no complicated translation routines within the computer and each country need only use its own thesaurus for retrieval.

Yours faithfully,

A. PRITCHARD

National Computing Centre Ltd,
Quay House,
Quay Street,
Manchester M3 3HU.

7th September 1972.

CURRENT AWARENESS LIST

Recent additions to the Aslib library catalogue are broken down into twelve broad groups, whose coverage is indicated below. These groups are not mutually exclusive but it is hoped that users will find them helpful in scanning for new items of interest.

User Studies
Analyses of information-seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory.

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject Organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies; reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies; directories.

JANET WALKLEY
Librarian

CURRENT AWARENESS LIST

Items are available in the Aslib Library and may be borrowed unless marked to indicate reference copies.*

User Studies

WIESENBERGER, IVAN
Nekteré psychologické aspekty uzivatelů informací.
Ceskoslovenska Informatika, vol.14, no.5, 1972, p.24–33.
Psychological aspects of information users.

DAVID, A.
L'information de l'ingénieur.
ANRT Information et Documentation, no.1, April 1972, p.23–6.
Research by the World Federation of Engineering Organizations into information needs and dissemination in engineering.

DAVID, A.
L'information économique des entreprises.
ANRT Information et Documentation, no.1, April 1972, p.8–12.
Industry's need for economics information, and how it may be supplied.

DAVID, A.
Comment les ingénieurs s'informent-ils? leur comportement pour les revues techniques.
ANRT Information et Documentation, no.1, April 1972, p.3–7.
Study of information acquisition by French engineers.

JONES, CLYVE *and others*
The characteristics of the literature used by historians.
Journal of Librarianship, vol.4, no.3, July 1972, p.137–56.
Investigation of literature by form, journal title, place of publication, language and age, with comparisons with other disciplines.

MALTBY, A. *and* SWEENEY, R.
The UK catalogue use survey.
Journal of Librarianship, vol.4, no.3, July 1972, p.188–204.

FJALLBRANT, NANCY
Courses in library techniques for university students in Britain.
Tidskrift for Dokumentation, vol.28, no.3, 1972, p.75–9.

TAYLOR, MARGARET
A self-study approach to reference sources.
Journal of Education for Librarianship, vol. 12, no.4, Spring 1972, p.240–6.
The programmed learning project to familiarize students with reference sources at the Graduate School of Library Studies, Hawaii University.

Communication and Knowledge

SETHI, ATMA RAM
Communication in libraries.
Herald of Library Science, vol.11, no.1, January 1972, p.43–52.
The nature of human communication, why it fails, and how effective communication may be achieved, with special reference to libraries.

FREEMAN, MONROE E.
Multidisciplinary information sources.
Journal of Chemical Documentation, vol.12, no.2, May 1972, p.94–6.
The problems of information dissemination in multidisciplinary areas, and how computers can help.

FOSKETT, D. J.
Information and general system theory.
Journal of Librarianship, vol.4, no.3, July 1972, p.205–9.
A consideration of the applicability of Bertalanffy's general system theory to libraries.

WILKINSON, ELIZABETH A.
The ambiguity of Bradford's law.
Journal of Documentation, vol.28, no.2, June 1972, p.122–30.
The 2 formulations on which recent discussion of the law of scatter has been founded are compared with empirical data.

Information Processing Systems

WELLISCH, HANS *and* WILSON, THOMAS D.
Subject retrieval in the seventies: new directions: proceedings of an international symposium held at the . . . University of Maryland . . . May 14–15, 1971. Westport (Conn.): Greenwood *and* Maryland University School of Library and Information Services, 1972.
viii, 180p.

WHITEHALL, T.
An integrated non-mechanized system for information bulletins and a keyword index.
Unesco Bulletin for Libraries, vol.26, no.4, July–August 1972, p.193–8.

A system for scanning, bulletin production and indexing suitable for the smaller library.

STARKER, L. N.
Pharmaceutical industry viewpoint of wordage problems: amount, languages, and access.
Journal of Chemical Documentation, vol.12, no.2, May 1972, p.88–93.
The dissemination of pharmaceutical information by primary, secondary and tertiary sources.

Language and Indexing

SKOLNIK, HERMAN
A multilingual index via the multiterm system.
Journal of Chemical Documentation, vol.12, no.2, May 1972, p.128–32.
Computer-production of a universally acceptable indexing system, with a multilingual capacity.

BROOKES, B. C.
The Shannon model of IR systems.
Journal of Documentation, vol.28, no.2, June 1972, p.160–2.
Attacks Zunde and Slamecka's declaration that optimum IR performance requires that descriptor terms be distributed in a geometrical progression.

HARLEY, A. J. *and* MYATT, A. G.
A contribution to the great debate.
NLL Review, vol.2, no.3, July 1972, p.77–81.
The effectiveness of title-searching compared with searching MEDLARS controlled subject headings.

BERNIER, CHARLES L.
Terse-literature viewpoint of wordage problems—amount, languages, and access.
Journal of Chemical Documentation, vol. 12, no.2, May 1972, p.81–4.
The advantages of one-sentence evaluative summaries of papers for information dissemination.

SMITH, B.
Some aspects of locating translations from Japanese scientific and technical periodicals.
NLL Review, vol.2, no.3, July 1972, p.82–4.
Describes 7 Japanese translation journals consisting of English versions of articles originally published in the Japanese language literature.

Classification and Cataloguing

HUCKABY, SARAH ANN SCOTT
An enquiry into the theory of integrative levels as the basis for a generalized classification scheme.
Journal of Documentation, vol.28, no.2, June 1972, p.97–106.
Argues that the hypotheses underlying the theory of integrative levels have not been adequately developed and confirmed for it to serve as a classificatory basis.

FID *and* JUGOSLOVENSKOG CENTRA ZA TECHNICKU I NAVCNU DOKUMENTACIJUA.
Proceedings of the international symposium: 'UDC in relation to other indexing languages', held in Herceg Novi, Yugoslavia, June 28–July 1, 1971.
Belgrade: FID *and* the Center, 1972.
lv [var. pag.]

CHMIDT, ADOLF-FRIEDRICH
Gedanken zur Reform der Dezimalklassifikation.
Nachrichten für Dokumentation, vol.23, no.3, June 1972, p.105–13.
Suggestions for revising UDC.

BRITISH STANDARDS INSTITUTION
Universal decimal classification: English full edition: 4th international edition: UDC 35/354: public administration.
London: the Institution, 1972. 580 06687 8.
32p. (BS 1000[35/354]: 1972; FID Publication no.179)

BRITISH STANDARDS INSTITUTION
Universal decimal classification: English full edition: 4th international edition: UDC 677: textile industry: textile processing cordage industry.
London: the Institution, 1972. 580 07131 6.
60p. (BS 1000[677]: 1972; FID Publication no.179)

TAIT, JAMES A.
Dewey Decimal Classification: a vigorous nonagenarian.
Library Review, vol.23, no.6, Summer 1972, p.227–9.
A review of the 18th edition.

RAVICHANDRA RAO, I. K. *and* RAWAT, K.
Computer programming language: depth classification version of CC.
Library Science With A Slant To Documentation, vol.9, no.1, March 1972, p.38–62.

RANGANATHAN, S. R.
Colon classification: notational system: towards a plan for its productive use.
Library Science With A Slant To Documentation, vol.9, no.1, March 1972, p.1–37.

WALI, M. L. *and* KOUL, R. K.
Development of notation in freely faceted classification: a case study.

Herald of Library Science, vol.11, no.1, January 1972, p.30–43.
The development of notation in the Colon Classification, its advantages and recommendations for its future evolution.

FRASER, WALTER J.
Overdue: closing the catalog: the Library of Congress and the future of cataloging practice.
Wilson Library Bulletin, vol.46, no.9, May 1972, p.836–8.
Recommends the closing of the LC catalog and the participation of the library community in the redesigning of LC's cataloguing.

SPARROW, T. A.
Application of group technology and casting classification in small-batch production foundries.
Foundry Trade Journal, vol.132, no.2888, April 13, 1972, p.489–91, 495–6.
The design of a system for casting classification and coding.

HÖPLER, W. W.
Vergleichskriterien unterschiedlicher Klassifikationssysteme.
Methods of Information in Medicine, vol.11, no.3, July 1972, p.144–51.
Criteria for comparing various systems of non-documentary classification in medicine.

Mechanization

CLAASEN, GUDRUN
Kosten der maschinellen Dokumentation: ein Literaturbericht.
Nachrichten fur Dokumentation, vol.23, no.3, June 1972, p.124–6.
A survey of the literature on the costs of retrieval from automated documentation systems.

ALLEGRE, M.
Le software documentaire disponible en France.
Documentaliste, vol.9, no.2, June 1972, p.47–81.
A survey of programs for information systems in France.

MEYRIAT, JEAN
L'automatisation documentaire en France.
Documentaliste, vol.9, no.2, June 1972, p.94–101.
Automated information processing in France.

BOSSMEYER, CHRISTINE
Kleincomputer-Einsatzmoglichkeiten in Bibliotheken und Dokumentationsstellen.
Nachrichten fur Dokumentation, vol.23, no.3, June 1972, p.114–8.
Suitable uses for minicomputers for information retrieval in libraries and information centres.

WINIK, RUTH
Reference function with an on-line catalog.
Special Libraries, vol.63, no.5–6, May–June 1972, p.217–21.
The on-line Experimental Library Management System (ELMS) for processing, used at the library of IBM Advanced Systems Development Division.

BUHR, LORNE R.
Selective dissemination of MARC: a user evaluation.
Journal of Library Automation, vol.5, no.1, March 1972, p.39–50.
Report of an evaluation of the SELDOM project at Saskatchewan University.

GRIFFIN, HILLIS L.
The cataloger's white knight: MARC.
Special Libraries, vol.63, no. 5–6, May–June 1972, p.235–9.
How MARC can help speed and rationalize libraries' cataloguing, and the possible development of a national system.

BODLEIAN LIBRARY
The Bodleian experiment in the use of MARC tapes: report to OSTI on grant no.SI/51/16 [Oxford]: the Library, March 1972.
[72]p. (OSTI Report no.5124)

DODD, G. A.
FAMULUS, as used at the Institute of Computer Science.
Computer Information, no.2, July 1972, p.1–4.
A program for producing the computerised catalogue of the ICS collection.

BUCKLAND, MICHAEL K. *and* GALLIVAN, BERNARD
Circulation control: off-line, on-line, or hybrid.
Journal of Library Automation, vol.5, no.1, March 1972, p.30–8.
After examining the requirements of computerised circulation systems, the author concludes that a hybrid system (which couples a dedicated library computer with a larger machine) is more cost-effective than conventional on-line working.

FOUND, WILLIAM H., *and* MORROW, DEANNA I.
Using the technical literature: one company's approach.
Tappi, vol.55, no.1, January 1972, p.84–7.
Describes the establishment and operation of a computer search service for the Georgia-Pacific Pulp and Paper Corporation.

GAYNON, P. *and* WONG, R. L.
A retrieval system for a library of pathology reports, slides and kodachromes.
Methods of Information in Medicine, vol.11, no.3, July 1972, p.152–62.
An automated natural language system for surgical pathology document-pairs, i.e. requests for examination and the corresponding reports.

Subject Organization

MARSHALL, MARGARET R.
British industrial libraries before 1939.
Journal of Documentation, vol.28, no.2, June 1972, p.107–21.
Traces growth of industrial libraries since 1870, and the growth of organizational framework.

CAMPBELL, H. C.
A Canadian social-science-data clearinghouse.
Unesco Bulletin for Libraries, vol.26, no.4, July–August 1972, p.188–92.
The development of social science data archives in Canada, and the objectives and organization of the clearing-house to be established to disseminate these data.

MCGUIRL, MARLENE C.
Summary of the survey of law libraries serving a local bar.
Law Library Journal, vol.65, no.2, May 1972, p.244–61.
Covers administration, budget, physical facilities, holdings, catalogue services, reference services, users, circulation and staff.

MOORE, JULIE L.
Bibliographic control of American doctoral dissertations.
Special Libraries, vol.63, no. 5–6, May–June 1972, p.227–30.
The history, purpose and coverage of the 3 main bibliographies (1 defunct) of American doctoral theses.

HOUGHTON, BERNARD *and* ROWLAND, GLYN
Index values.
New Library World, vol.73, no.866, August 1972, p.363–4.
A comparative evaluation of *British Technology Index*, *Applied Science and Technology Index* and *Engineering Index*.

HALL, AUDREY
Three kinds of lies.
New Library World, vol.73, no.866, August 1972, p.366–7.
The difficulty of obtaining accurate university library statistics from the *Aslib Directory* and the *Libraries, Museums and Art Galleries Yearbook*.

Reprography

HARVEY, PETER
Reprography: the management tool rapidly becoming a science.
Management in Action, vol.3, no.35, August 1972, p.13.
Describes various methods of reprography.

WILLEMSE, JOHN
Preliminary report on an experimental project to supply recommended books to students in microfiche form.
NRCd Bulletin, vol.5, no.3, Summer 1972, p.69–72.
Report of an experiment at the University of South Africa.

KEAST, HORACE
The use of microfilm: LAMSAC report.
Local Government Chronicle, vol.117, January 21, 1972, p.99.
A summary of a recent report by a working party of the O & M and Work Study panel of LAMSAC.

COPYING: a special analysis
Business Equipment Digest, vol.12, no.8, August 1972, p.6–24.
Survey of specifications and costs of dyeline, diffusion transfer, dual spectrum, electrostatic, reflex, thermal and xerographic copiers.

CABLE television
Advanced Technology: Libraries, vol.1, no.4, April 1972, p.1–8.
Cable television technology and its applications to libraries.

Printing and Publishing

MOORE, JAMES A.
An inquiry on new forms of primary publications.
Journal of Chemical Documentation, vol.12, no.2, May 1972, p.75–8.
Present problems of journal publication and the two-tier system for overcoming them: to publish a short-article hardcopy edition and to make available a full-article microfilm edition on request.

KUNEY, J. H.
The role of microforms in journal publication.
Journal of Chemical Documentation, vol.12, no.2, May 1972, p.78–80.
The increased need for the use of microform in primary publications, with especial reference to American Chemical Society journals.

THUSS, JOACHIM
Das Depotsystem: eine neuere Form der Dokumentation von Zeitschriftenveröffentlichungen.
Dokumentation, Fachbibliothek, Werksbucherei, vol.20, no.4, July 1972, p.135–6.
A system of journal publishing whereby abridged articles only are printed, and the full versions held on microfiche to be made available to requesters.

GRAHAM, W. GORDON *and* CLOUTER, W. G.
Comparative book-buying habits.
Times Higher Education Supplement, no.41, July 21, 1972, p.15.
Two extended letters from publishers on book-buying by students.

ROSENSTEIN, PHILIP
Some implications for libraries of the recent Williams and Wilkins decision.
Special Libraries, vol.63, no.5–6, May–June 1972, p.275–6.
Implications for library photocopying of the judgment in the recent copyright case.

WILLIAMS & Wilkins case analysis
Information, Pt.1, vol.4, no.2, March–April 1972, p.67–9.
Reprinted from *ARL Newsletter*, no.53, 3 March 1972.

KATZENBERGER, PAUL *and* KOLLE, GERT
Die urheberrechtliche Beurteilung computerunterstützter parlamentarischer Informations - und Dokumentationssysteme.
Nachrichten fur Dokumentation, vol.23, no.3, June 1972, p.94–104.
The copyright problem in parliamentary information systems.

Administration and Management

MOREY, THOMAS
Many benefits from centralized library services.
Special Libraries, vol.63, no.5–6, May–June 1972, p.245–7.
Centralized processing by the library services unit of the Xerox Corporation.

CASEY, EVALYN M.
The all-purpose law librarian: endeavor and resignation.
Law Library Journal, vol.65, no.2, May 1972, p.134–9.
How to survey the activities of a small law library.

OLSEN, HAROLD ANKER
The economics of information: bibliography and commentary on the literature. 2nd ed.
Information: Pt.2: Reports, Bibliography, vol.1, no.2, March–April 1972, p.i–viii, 1–40.
Comprises the 1st edition plus a supplement of 160 items mostly published in 1971.

HODOWANEC, GEORGE
Current literature in technical processes: a selective annotated bibliography.
Special Libraries, vol.63, no.5–6, May–June 1972, p.248–64.

WRIGHT, LANCE
Library Trinity College, Dublin.
Architects Journal, vol.156, no.30, July 26, 1972, p.205–16.
A reappraisal of the building first reported in *Architects Journal*, October 11th, 1967.

BERKOWITZ, RHODA L.
Personnel evaluation.
Law Library Journal, vol.65, no.2, May 1972, p.154–7.
Compares the traditional traits method and the new goals method.

OLIVER, MARY W.
Orientation of new personnel in the law library.
Law Library Journal, vol.65, no.2, May 1972, p.140–2.
Sketches a programme for introducing staff to a new job, and the need for staff manuals and training.

ASHEIM, LESTER
The preparation and use of library manpower.
Bulletin of the Medical Library Association, vol.60, no.2, April 1972, p.288–91.
A review of the American Library Association's official 'Policy on Library Education and Manpower' of June 1970 and its application to medical librarianship.

TREBBLE, A.
Progress in documentation: non-book materials: the control of non-book materials in the United Kingdom.
Journal of Documentation, vol.28, no.2, June 1972, p.151–9.
A 'state-of-the-art' review of the librarianship of non-book materials, especially their bibliographical control.

POULOS, ARTHUR
Audio and video cassettes: friend or foe of the librarian?
Special Libraries, vol.63, no.5–6, May–June 1972, p.222–6.
The capabilities of cassettes and their possible uses in libraries.

Library Systems

LEBEL, GERMAINE
La Bibliotheque publique scientifique et Technique d'État de l'U.R.S.S., à Moscou.

Bulletin des Bibliothèques de France, vol.17, no.5, May 1972, p.227–40.
The functions and activities of the Russian State Scientific and Technical Library.

RAMOS, SIDROC
Twelve years work at the National Library of Cuba.
Unesco Bulletin for Libraries, vol.26, no.4, July–August 1972, p.210–3.
Post-revolutionary developments: organization, new departments and services, publishing, exhibitions, contributions to International Book Year, etc.

HEFFERLIN, J. B. *and* PHILLIPS, ELLIS L.
Information services for academic administration.
San Francisco: Jossey-Bass, 1971. 0 87589 096 2.
xiv, 160p.

ROBERTS, NORMAN
University libraries.
Library Association Record, vol.78, no.8, August 1972, p.141–3.
Recent activities in British university libraries.

LORENZ, JOHN G.
Library networking: progress in library cooperation.
Illinois Libraries, vol.54, no.5, May 1972, p.309–17.
Covers the National Program for Acquisitions and Cataloging (NPAC), MARC, RECON, the Multiple Use MARC System (MUMS), regional networks, the contribution of other national libraries and conferences.

PIZER, IRWIN H.
Cooperation: the problems; the rewards.
Illinois Libraries, vol.54, no.5, May 1972, p.373–7.
The need for standardization as a prerequisite of library co-operation, some examples of co-operation in library automation and needs at national level.

LENOIR, M.
Relations entre le réseau des C.C.I. et les centres de documentation membres de l'A.N.R.T. pour la coordination entre l'information économique et l'information scientifique et technique.
ANRT Information et Documentation, no. 1, April 1972, p.28–31.
How the French Chambres de Commerce et d'Industrie and the information centres belonging to the Association Nationale de la Recherche Technique could co-operate.

GENZEL, PETER
Die ökonomische Rentabilitat der Weiterleitungsfunktion einer internationalen Austauschstelle.
Zentralblatt für Bibliothekswesen, vol.86, no.6, June 1972, p.321–51.
An East German investigation into the relative costs of centralised and direct exchange of library materials.

KANEVSKIJ, B. P.
The international exchange of publications and the free flow of books.
Unesco Bulletin for Libraries, vol.26, no.3, May–June 1972, p.141–9.

Professional Activity

WELLISCH, HANS
From information science to informatics: a terminological investigation.
Journal of Librarianship, vol.4, no.3, July 1972, p.157–87.
The concept of information science, and how differences in this are reflected in terminological differences.

CHAPLIN, A. H.
The organization of the library profession: final report of two plenary sessions of the IFLA General Council, Liverpool, 1971.
Unesco Bulletin for Libraries, vol.26, no.4, July–August 1972, p.178–83.
The achievements of library associations throughout the world, and problems still requiring attention.

PLESSKE, HANS-MARTIN
Geschichte und Funktion der Internationalen Vereinigung der Musikbibliothekin (IVMB).
Zentralblatt für Bibliothekswesen, vol.86, no.6, June 1972, p.352–9.
The history and activities of the International Association of Music Libraries.

OLSEN, EDWIN E. *and others*
An educational model for library problem-solving: teaming librarians, students and faculty.
Special Libraries, vol.63, no.5–6, May–June 1972, p.231–4.
A co-operative educational project by the National Agricultural Library and the School of Library and Information Services at Maryland University.

DAILY, JAY E.
Crisis available on the hire-purchase plan: the changing nature of education for librarianship.
Libri, vol.22, no.2, 1972, p.120–9.
How new notions of information science must revolutionize library education.

STONE, ELIZABETH W.
The role of AALS in lifetime learning for librarians.
Journal of Education for Librarianship, vol.12, no.4, Spring 1972. p.254–66.
How the library schools which are members of the Association of American Library Schools can promote continuing library education.

STREBL, LAURENZ
Bibliothek, Bibliothekar, Wissenschaft.
Biblos, vol.21, no.2, 1972, p.87–93.
The notion of librarianship as a profession and consequences for education.

BOWDEN, ANN
Training for rare book librarianship.
Journal of Education for Librarianship, vol.12, no.4, Spring 1972, p.223–31.
A survey of library school provision in the U.S. and Canada.

MARKS, ERIKA
Das bibliothekswissenschaftliche Fernstudium — eine neue Ausbildungsform.
Zentralblatt fur Bibliothekswesen, vol.86, no.6, June 1972, p.345–52.
Extra-mural courses in librarianship at Humboldt University in East Berlin.

PANNU, GURDIAL S.
Research in librarianship and the Canadian Library Association.
Canadian Library Journal, vol.29, no.4, July–August 1972, p.300–5.
The rôle played in research by the American Library Assn, and the Library Assn., and the rôle which the Canadian L.A. should play.

* UNESCO. DEPARTMENT OF DOCUMENTATION, LIBRARIES AND ARCHIVES
List of library and documentation associations.
Paris: Unesco. January 1972.
28p.

* INTERNATIONAL ORGANIZATION FOR STANDARDIZATION
Directories of libraries, information and documentation centres: 1st ed.
[Geneva]: the Organization, 1972.
[41]p. (ISO 2146-1972 (E))

MEMBERS' ADVERTISEMENTS

Acceptance of advertisements for publication in Proceedings *does not imply Aslib support for or endorsement of the goods or services advertised.*

Members' advertisement rates: first 15 words (minimum), 50p; 3p for each additional word. 10p if box number required. (No agency discount.) A separate section of these columns is available to non-members at £3 per s.c.i.

Translations services

MEDICAL AND HIGHLY SPECIALIZED SCIENTIFIC TRANSLATIONS. S.M. Bonnekamp, FIL, Member of the Translators' Guild (Med. Science & Lit.), 47 Firs Close, Muswell Hill, London, N10. Tel. 01-883 3962 during office hours. After office hours an automatic telephone answering machine will record messages.

BUILDING AND CIVIL ENGINEERING TRANSLATIONS from Russian and German into English. G. L. Cairns, MIL, 19 Kingsley Place, London N6. Tel. 01-340 8990.

TECHNICAL SWEDISH, DANISH, NORWEGIAN translated by J. T. Craddock, BCOM, FIL, Ekard, Ray Park Avenue, Maidenhead, Berks. Maidenhead 24931.

RUSSIAN/ENGLISH TRANSLATIONS. Twenty years' experience Government Department. Native Russian. A. de Merindol, 19 Ingelow House, Kensington, W8. 01-937 6788.

JAPANESE/ENGLISH RUSSIAN/ENGLISH translations. Chemistry, medicine, biology, zoology. D. A. Fraser, BA, MIL, 22 Gresley Road, London N19 3JZ. Tel: 01-272 5564.

WILFRED E. GOODAY, ARSM, DIC, C.ENG, MIMM, FIL. Member of Translators' Guild, Romanian and French. 161 Rivermead Court, London SW6. RENown 1912.

SCIENTIFIC TRANSLATIONS FROM JAPANESE, CHINESE, RUSSIAN, CZECH and East and West European languages into English and/or German. A. K. Henn, B SC, 'Glenside', Lower Leigh Rd., Pontnewynydd, Pontypool, Mon. Tel: Pontypool 3689 (after 6 p.m.).

BILINGUAL (JAPANESE/ENGLISH), ESTABLISHED translator of an extensive range of subjects in science and technology. Owns a bilingual reference library and typewriters for symbols and Greek, Western European and Japanese languages. David Jackson, FIL, FCS, 71 Livingstone Road, Gillingham, Kent. Telephone: 0634 52994.

MEDICAL, PHARMACEUTICAL, BIOLOGICAL translations from French, Romanian and Portuguese into English and from English into French and Romanian. Dr J. Jacobson, 94 Temple Fortune Lane, NW11. 01-455 1010.

TECHNICAL TRANSLATIONS from Russian, German and Polish into English. B. Klipstein, BSC(HONS), 1 Glenview Grove, Shipley, Yorkshire. Tel. Shipley 58215.

TECHNICAL AND COMMERCIAL translations from English into Russian. Mrs O. Linsley, 31 Parke Road, Barnes, London SW13. Tel. 01-748 8822.

TECHNICAL TRANSLATIONS from Japanese into English. R. A. Scutt, BA, 48 Somerset Avenue, West Wimbledon, London SW20. Tel. WIMbledon 1713 (01-946 1713).

TECHNICAL OR COMMERCIAL translations into/from English, German, Dutch and French. A. M. H. Speller, FIL, NGV, 6 Lakeside, West Ealing, London, W13 8HN. Tel. 01-998 1045.

AUTHORITATIVE TECHNICAL TRANSLATIONS. Spanish, French, Italian, German, Portuguese, camera copy or printed. E. W. Sykes, FIL, 39 West Close, Wembley, Middlesex, HA9 9PJ. Tel. 01-904 4273.

For sale

PROCEEDINGS OF THE NUTRITION SOCIETY, vols. 19–30, 1960–71 complete (19–27 bound). £25. Mrs M. Scrimgeour, Oak Tree Cottage, Little Bealings, Woodbridge, Suffolk.

Advisory services

IRAS: A NEW ADVISORY SERVICE. As much or as little advice and assistance as you need—anything from a half-day's talk to a six-months' assignment. Miss Helen Townley, I.R. Advisory Services, 117 Wickham Chase, West Wickham, Kent, BR4 0BQ. 01-777 7560.

NON-MEMBER'S ADVERTISEMENT

YOUR COMPANY HISTORY—whether book or booklet, commission a full-time professional industrial historian to research and write it. Hugh Barty-King, BA(CANTAB), Holgate House, Ticehurst, Wadhurst Sussex; Tel. Ticehurst (05807) 557.

TECHNICAL LIBRARIAN

The Chloride Group seeks a **Chartered Librarian** preferably with experience in an industrial library or information unit, to organise, operate and expand an existing technical library on active and dynamic lines.

The Library is located at the Group's Technical Centre in the North West of England and will provide a service under the Information Officer to the Central Research Unit, to world wide manufacturing units and to a Techno-economics unit, particularly in the fields of electrochemistry, metallurgy and electronics.

The post offers a challenge and opportunity to develop in a positively orientated environment to an enthusiast with a capacity for sustained hard work.

Applications in writing to:

D. C. Savage, Personnel Manager, Chloride Technical Centre, Wynne Avenue, Swinton, Manchester.

'Micropublishers, reader and retrieval system manufacturers, microform users – in fact, almost everyone connected with the micrographic industry – will find a valuable and convenient reference source in this book.'

Micrographic Weekly

Miniaturised Communications

A review of microform

B. J. S. WILLIAMS

Published by

THE LIBRARY ASSOCIATION

in conjunction with

THE NATIONAL REPROGRAPHIC CENTRE
FOR DOCUMENTATION

£1.50 (£1.20 *to L.A. members*)

Asian Publications from Mansell

South Asian Government Bibliographies

The volumes in this series provide the most complete listing of central government publications, serials and non-serials, of Ceylon, India, and Pakistan so far compiled. This vital record of primary sources for the study of South Asian affairs is available as a three-volume set or individually by country.

Three volumes 10 x 7 in. 350 pages Approx. 7,000 entries
£9.50 sterling or US $25.00

Union Catalogue of Asian Publications

An author listing of most books from Asia purchased by British libraries since 1965, this catalogue includes books published in all languages in Asia outside the Soviet Union and those published in Arabic or the Ethiopic languages in North Africa. With the exception of pure science and technology, all subjects are covered and the 58,000 different titles range from modern works to works of great rarity published three or four hundred years ago.

Four volumes (primary sequence) 13¾ x 10¼ in. Approx. 68,000 entries each
£155.00 sterling or US $400.00

Individual brochures are available from the publishers

Mansell 3 Bloomsbury Place, London WC1A 2QA, England

British Technology Index

CURRENT SUBJECT GUIDE TO BRITISH TECHNICAL JOURNALS

FOR TRACING AND RECALL

of $\left\{\begin{array}{l}\text{specific}\\ \text{recent}\end{array}\right\}$ Information

In the Field of Applied Science, Engineering and Manufacturing Technology

Monthly Parts and Annual Volume

THE LIBRARY ASSOCIATION

7 Ridgmount St. Store St. London, WC1 7AE

(Phone: 01-636 7543)

LIBRARY BINDING

This has been our trade since the last century, and in practising our craft we have given service to all types of libraries in many corners of the World.

We like to think we still bind books for libraries rather well, apart from our other activities as publishers and booksellers.

CEDRIC CHIVERS LTD

PORTWAY
BATH BA1 3NF

FIRST for carpets
Dodson Bull

UP TO 30% DISCOUNT
BRANDED CARPETS

● All makes available with full Manufacturers' Guarantees ● NO IMPERFECT GOODS SOLD ● Free delivery in U.K. ● Expert fitting service available

£200,000 carpets on display
In our extensive London and provincial showrooms
Free brochure on request to Dept ALB

DODSON BULL CARPET CO. LTD.

LONDON: 5 & 6 Old Bailey EC4M 7JD. Tel: 01-248 7971
BIRMINGHAM: 164 Edmund St B3 2HB.
Tel: (021) 236 5862
BOURNEMOUTH: 268 Old Christchurch Rd BH1 1PH.
Tel: 21248
BRIGHTON: 2-5 North Road BN1 1YA. Tel: 66462
BRISTOL: 2-3 Royal London House, Queen Charlotte St BS1 4EX. Tel: 28857
LEEDS: 12 Great George St LS1 3DW. Tel: 41451
MANCHESTER: 55-61 Lever St M1 1DE.
Tel: (061) 236 3687/8/9
NEWCASTLE-upon-TYNE: 90-92 Pilgrim St NE1 6SG.
Tel: 20321/21428
WESTCLIFF-on-SEA: 495 London Rd SS0 9LG.
Tel: Southend 45569
9.00-5.30 Mon.-Fri. Sat. 9 00-12 00 (Manchester 9 00-4 00)

from the Azores to the Urals . . .

from Reykjavik to Rhodes . . .

CBD Research Publications relating to

EUROPE

- Directory of EUROPEAN ASSOCIATIONS
  Part I: National industrial, trade and professional associations. Edition I, 1971.
- STATISTICS - EUROPE: Sources for market research.
  Edition 2, 1972.
- EUROPEAN COMPANIES: A guide to sources of information.
  Edition 3, 1972.
- Current EUROPEAN DIRECTORIES
  Edition I, 1969. New edition in preparation.

All cover not only The Six, The Seven, The Ten, but all countries from Iceland to Greece, from Portugal to the Soviet Union.

For descriptive catalogue contact:

CBD

CBD Research Ltd
154 High Street, Beckenham, Kent, England
01-650-7745.

29 JAN 1973

Generating and printing indexes by computer

Lucille H. Campey

This is a survey of computer techniques used in producing printed subject indexes and of available, operational computer software based on these techniques with emphasis on UK systems. Details of machine requirements, component programs, input/output and availability conditions for over 100 operational index generation packages are reported, of which over 50 are UK systems and 20 are available from IBM.

Occasional Publication No 11 *SBN 85142 047 8* *£3.50*

A guide to selected computer-based information services

Compiled by Ruth Finer

This guide has been compiled as a result of a number of requests from Aslib members and to complement the information made available at the 1972 Aslib Annual Conference on External Information Services.

It provides detailed information for 48 computer-based information services, under standard headings such as Nature of Service, Cost, Data-base, and Methods of Assembling, Producing and Retrieving Information.

SBN 85142 045 1 *£2.40 net; £1.20 to members*

Aslib Publications

Published in England by Aslib, 3 Belgrave Square, London SW1X 8PL

Aslib Proceedings

incorporating Aslib Information

Thesaurus reconciliation H. H. NEVILLE 620

Looking at libraries P. A. THOMAS 627

Analysing industrial information service costs: a simple check list ALAN ARMSTRONG 635

ASLIB · 3 BELGRAVE SQUARE · LONDON SW1

Aslib Proc. vol. 24 no. 11 pp. 605-646 London, November 1972

Asian Publications from Mansell

South Asian Government Bibliographies

The volumes in this series provide the most complete listing of central government publications, serials and non-serials, of Ceylon, India, and Pakistan so far compiled. This vital record of primary sources for the study of South Asian affairs is available as a three-volume set or individually by country.

Three volumes 10 x 7 in. 350 pages Approx. 7,000 entries
£9.50 sterling or US $25.00

Union Catalogue of Asian Publications

An author listing of most books from Asia purchased by British libraries since 1965, this catalogue includes books published in all languages in Asia outside the Soviet Union and those published in Arabic or the Ethiopic languages in North Africa. With the exception of pure science and technology, all subjects are covered and the 58,000 different titles range from modern works to works of great rarity published three or four hundred years ago.

Four volumes (primary sequence) 13¾ x 10⅛ in. Approx. 66,000 entries each
£155.00 sterling or US $400.00

Individual brochures are available from the publishers

Mansell 3 Bloomsbury Place, London WC1A 2QA, England

Aslib Proceedings

incorporating Aslib Information

VOLUME 24 NOVEMBER 1972 NUMBER 11

Further information about Aslib's services and membership rates will be supplied on application to the Director, Aslib, 3 Belgrave Square, London SW1X 8PL. Tel. 01-235 5050. Telex 23667; answer-back, Aslib London.

ASLIB CALENDAR 1972

December

MON.4	Economic and Business Information/Social Sciences Group joint evening meeting: 'Social statistics', by Mrs M. Nissell (Central Statistical Office). Royal Institution of Naval Architects, 10 Upper Belgrave St, SW1. 5 for 5.30 p.m.
TUE.5.	Transport and Planning Group Christmas meeting and lecture: 'Pedestrianisation'. Claude Gill Books Ltd, Oxford St, W1. 6.00 p.m.
	Midlands Branch afternoon Workshop: 'Thesaurofacet', 'Forward planning' and 'USA visit'. Imperial Centre Hotel, Birmingham. 2.30 p.m.
WED.6.	Technical Translation Group meeting. Claude Gill Books, Oxford Street, W1. 5.30 p.m.
MON.11.	Co-ordinate Indexing Group meeting. Aslib. 3.30 p.m.
WED.20.	Aslib Christmas Party. Aslib. 5.30 p.m.

1973

January

WED.3.	Chemical Group wine and cheese party. Aslib. 5.30 p.m.
THU.4.	Economic and Business Information Group evening meeting, film show and sherry party. Aslib. 5.30 p.m.
TUE.9.	Midlands Branch/Institute of Information Scientists joint meeting. Imperial Centre Hotel, Birmingham. 6.15 p.m.
WED.10.	Aslib evening meeting: 'Project Sappho', by Dr A. B. Robertson (Sussex University). Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1. 5.30 p.m.
WED.17–THU.18.	Midlands Branch Conference: 'Microfilms for industry–with exhibition.' Leicester.
THU.18.	Computer Information Group evening meeting: 'Classification schemes', by Alan Pritchard. Aslib. 5.30 p.m.

ASLIB INFORMATION

Aslib Periodicals

As members will have seen from the leaflets distributed recently, Aslib has carried out a complete review of its periodical publishing programme, as a result of which important changes will be made in 1973. In making these changes the main object has been to meet the demands of members by providing a more coherent grouping of the material now covered by the various journals and to make other desired improvements in coverage and presentation.

From 1st January 1973, Aslib will publish six periodicals, and full details of these are set out in the Aslib 'Services' leaflet accompanying this issue of *Proceedings*. All corporate and individual members of Aslib will continue to receive three of these journals as part of their membership entitlement, namely *Aslib Information*, *Aslib Proceedings* and the *Journal of Documentation*, and will be able to purchase additional copies of these at members' rates. Associate members will receive *Aslib Information* and either *Aslib Proceedings* or the *Journal of Documentation* as part of their entitlement.

Program and *Forthcoming International Scientific and Technical Conferences* will continue to be available on subscription as before.

The main change in the distribution pattern concerns the *Aslib Book List*, which will in future be made available to members at a special subscription rate. At the same time every effort will be made to improve its usefulness by enlarging its coverage.

Non-member subscribers to Aslib journals should have also received separate notification of the editorial changes concerning *Aslib Proceedings* and *Aslib Information* (see 'Services' leaflet enclosed).

Any further enquiries from members should be addressed to the Membership Secretary, and from subscribers to the Publications Officer, at Aslib, 3 Belgrave Square, London SW1X 8PL.

Aslib Proceedings: 'Call for papers'

As part of the new editorial policy for Aslib periodicals beginning in 1973, *Aslib Proceedings* will now contain contributed papers in addition to those presented at Aslib meetings and conferences. We are looking for well-written papers, not exceeding three thousand words in length, of a practical nature and of some relevance to problems encountered in the everyday operation of library and information units, or services. Other kinds of contribution which will be considered for inclusion are short notes on new information units or special libraries; the introduction of new techniques or systems in existing libraries where these may be of general interest; equipment designed by members for special purposes and put into operation in their own organizations; and objective reports on experience with new 'packaged' commercially available information services.

Contributions, which should be typewritten, double-spaced, single-sided, on A4 paper, should be addressed to the Editor, *Aslib Proceedings*, 3 Belgrave Square, London SW1X 8PL.

Advertisements in *Aslib Information*

Readers should note that, apart from news items, a current awareness list, announcements of forthcoming meetings, etc., *Aslib Information* will also contain an advertisement section which will cater particularly for job advertisements. It will now be possible therefore to place 'Appointments vacant' advertisements in *Aslib Information* at fairly short notice—either as a display advertisement or as a member's advertisement (which will continue to be at a special rate but will not be displayed). *Aslib Proceedings* will continue to take other advertisements in the normal way.

Full details of copy-dates, rates, etc. for advertisements in all Aslib periodicals will be available shortly.

New Members

CORPORATE

(*specialized Group interests are given after names, where relevant*)

Name	*Location*	*Representative*
British Chemical Engineering Process Technology	London, EC1	J. MacDonald
British Sugar Corporation	London, W1	C. Townsend
Columbus Dixon Ltd (*Chem*, *Eng*)	Wembley, Middx.	J. T. Wilkins
D. C. Heath Ltd	Farnborough, Hants	Mrs J. Gurney
McCann Ericson Advertising Ltd (*Econ*)	London, W1	Miss E. Saunders
Ortho Pharmaceuticals (*Bio*, *Chem*, *CIG*)	High Wycombe, Bucks	Mrs J. Wilson
Pergamon Press	Oxford	H. A. Richardson
Rank Xerox Ltd	Welwyn Garden City	D. A. Pleasance
J. Sainsbury Ltd	Clapham, SW4	H. G. Harrison
Servier Laboratories (*Bio*, *CIG*, *TTG*)	Harrow, Middx.	Mrs K. Foreman
Williams Glyn & Co.	London, EC4	Mrs T. Palmer
Centre for Studies in Social Policy (*CIG*, *Econ*, *SSG*, *Trans*)	London, WC2	Miss S. Johnson
Scientific Documentation Centre Ltd	Dunfermline	P. S. Davison
Queen's Institute of District Nursing	London, SW1	Mrs F. Faktor
West London College (*CIG*, *Econ*, *CAG*, *Comp. Inf.*, *SSG*, *TTG*)	London, W14	Mrs P. Trenaman
Stelco (Steel Co of Canada) (*Chem*, *Econ*, *Eng*)	Hamilton, Canada	A. D. Dick
Electricité de France	Clamart, France	Mrs le Chanu
Framatome	Courbevoie, France	Ph. Bellut
Plantex Ltd	Natharya, Israel	M. Nissim
Hong Kong Tourist Association (*AVG*, *CIG*, *Econ*, *Trans*)	Hong Kong	J. Pain
Industry Information Centre	Toronto	S. Bene
Association des Diplomes de l'Ecole de Bibliothécaires-Documentalistes	Paris	Miss M. Daloz
Centre for Technological and Inter-disciplinary Forecasting	Tel-Aviv	O. Kahana
Midwest State Library Services	Benin City, Nigeria	Miss P. Harris
Rosary College—School of Library Science	Illinois	Sister L. McKusker

INDIVIDUALS

Miss W. D. Abbot (*Trans*)
Miss J. M. Allford
R. Ardern (*CIG*)
Miss S. Boyle (*Econ*)
Miss K. Crawford (*CAG*)
Mrs H. R. Harris
J. Myers
P. Olijnychenko (*TTG*)
T. Summers
Mrs C. J. Taylor (*CAG*)
J. R. A. Walker (*Eng*)
M. J. D. Willsher (*Bio*)
Mrs S. Dextre (Peru)
Miss M. Guedelin (France)

Aslib 46th Annual Conference

Some 350 delegates attended Aslib's 46th Annual Conference, from 24th to 27th September 1972, and received a warm and generous welcome from the City and University of Sheffield. The theme of the Conference, 'External information services: their use to improve internal information services and their impact on special libraries and information units', was vividly illustrated by an exhibition of organizations providing external (and particularly computerized) information services on a commercial basis, strategically displayed in the centre of the Conference area in Ranmoor House, University of Sheffield. The speakers included D. V. Arnold, B. C. Vickery, J. E. Terry, P. J. Jones, P. D. Friend, F. Robinson, C. C. Parker, Mrs B. F. M. Helliwell, Dr M. A. Simkins, T. Whitehall, H. J. Zwillenberg (whose paper was read by K. J. Hodges), Miss H. M. Townley, J. S. Rippon, Dr W. E. Batten, H. F. Dammers, C. G. Giles and B. T. Stern.

Sir Alan Wilson, supported by two Vice-Presidents, Dr J. W. Barrett and H. R. Mathys, presided over the Conference Dinner, at which Aslib entertained the Lord Mayor of Sheffield and the Lady Mayoress, the Vice-Chancellor of Sheffield University, Professor H. N. Robson, Councillor Mrs Hattersley, representatives of the University and City of Sheffield Libraries, and Professor W. L. Saunders, with their wives. A highlight of the social programme was the Civic Reception given by the Lord Mayor and the City of Sheffield in the Mappin Art Gallery.

Delegates had a large and exciting programme of visits from which to choose: Sheffield Central Library, Graves Art Gallery, Crucible Theatre and Cutlers' Hall; Sheffield University Library, with a talk about the work of the Postgraduate School of Librarianship and Information Science; Geo. Bassett & Co. of liquorice allsorts fame; British Steel Corporation Special Steels Division Swinden Laboratories; British Steel Corporation Rotherham and Aldwarke steelworks; the laboratories and library of the Safety in Mines Research Establishment; Whitbread (East Pennines) Ltd, Exchange Brewery; the British Glass Industry Research Association and Sheffield University Department of Glass Technology; a conducted tour of Sheffield and the Abbeydale Industrial Hamlet; Haddon Hall and the National Lending Library for Science and Technology at Boston Spa.

Aslib was happy to welcome a much larger than usual contingent of delegates from overseas—Europe and further afield—a forerunner, we hope, to greater internationalism in future years.

Papers given at the Conference will be published in the December 1972 and January and February 1973 issues of *Aslib Proceedings*.

Co-ordinate Indexing Group Conference: 'Informatics 1: structure and meaning'

The Aslib Co-ordinate Indexing Group will hold its annual conference next year from 11th to 13th April at the University of Durham.

Previous Aslib CIG conferences have been following an evolutionary course: and two fundamental, related problems have emerged which need to be considered in the design of information retrieval systems. These are structure (syntax) and meaning (semantics). At the same time it has become evident that the problems cannot be confined to co-ordinate indexing, or even to the wider field of classification and indexing, but are a dominant facet of communication.

To reflect the need for a broader outlook the title 'Informatics 1' has been chosen for the conference. Informatics has been defined by its Russian originators as 'the processes, methods and laws related to the recording, analytical-synthetical processing, storage, retrieval and dissemination of scholarly information but not the scholarly information as such which is the attribute of its respective science or discipline'. It is a truly international word (it does not require translation within Western Europe and is easy to transliterate); this is significant as the problems being considered do not halt at lingustic frontiers. The '1' is introduced merely to show the immensity of the problems and to indicate that it is realized that they cannot be resolved at one conference.

It is hoped that it will be possible to assemble speakers (and other participants) from a seemingly diverse range of disciplines representing linguistics, mathematics, lexicography, machine intelligence, information theory and taxonomy in addition to documentalists, information scientists and librarians.

Apart from an introductory session, reviewing the scope of informatics, the sessions will take the form of alternating fundamental and applied papers. Participants can either attend all papers to hear a loose dialogue, as papers on the linguistic or mathematical fundamentals are thrown into relief by papers representing pragmatic problems in information retrieval; or they can consider the sessions as being parallel with the opportunity of partaking in interspersed discussions on the applied or theoretical aspects.

Although it is hoped that componential analysis and semantic fracturing, channel capacity and coding, and mathematical taxonomy and bibliographical clustering, may be thrown into juxtaposition, it is desirable that potential speakers should avoid the excessive use of jargon! If a dialogue is to be established participants must select their terminology with care and be careful to define any abstruse words or formulae.

Direct approaches will be made to a number of potential participating speakers, but an open invitation is extended to anyone wishing to submit a paper within the general framework of 'structure and meaning'. Papers should be capable of being presented within half an hour (extra time will be allotted for discussion), but longer presentations may be considered. Free accommodation will be provided for participating speakers.

Individuals wishing to submit papers for consideration should send a short abstract and title to: Kevin P. Jones, NRPRA, 56 Tewin Road, Welwyn Garden City, Herts. Tel.: Welwyn Garden City 25474. Other details about

Informatics 1 may be obtained from: Michael Rostron, Hutton & Rostron, 42 Claremont Road, Surbiton, Surrey. Tel.: 01-399 2473.

Short Course Provision in Information/Library Work and Computer Appreciation

This short report, by Margaret Slater of the Aslib Research and Development Department, describes and summarizes the provision of informal education (non-qualifying short courses) for information/library staff during 1971. Results of this study are of potential use and interest to anyone concerned, directly or indirectly, with the education, training and employment of information/library personnel at all levels.

Parallel information for the same sample year (1971) is given for another subject field (computer appreciation courses). The purpose in providing such 'control group' data was, frankly, purely comparative. It goes some way towards answering important questions, such as: Are short courses in information/library work expensive or not? Is their duration average for short courses? The section on computer course data may, however, in its own right, be of interest to those concerned with this aspect of education for computer work.

Areas covered in both fields of investigation include: number of courses and their seasonal distribution; organizing bodies; location and venue; subject coverage; level (intended audience); average size of audience; demand for courses of various kinds (repeated courses); average duration; average price.

Work described in this publication was undertaken as the background pilot phase of a main project (now in progress), concerned with the assessment and evaluation of short courses in information work and librarianship.

The report is available free of charge on application to: Mrs Margaret Slater, Aslib, 3 Belgrave Square, London SW1X 8PL.

First European Congress on documentation systems and networks

A one-day Seminar on Operational Documentation Systems is being organized by Aslib in Luxembourg on 14th May 1973, as a preliminary to the 'First European Congress on documentation systems and networks'. The Congress is being organized by the Commission of the European Communities from 16th to 18th May 1973, and three sessions have been arranged dealing with: Input operations—data collection and storage; Processing methods—products and services; and Financial and management aspects. The working languages will be English, French and German.

Anyone wishing to submit a paper to the main congress should contact one of the three organizers: Institut Français de Formation Permanente (IFFP), 14 Rue Gramme, Paris XV (attn. Mrs Stern); Bureau Marcel van Dijk, 409 Avenue Louise, 1050 Bruxelles; CCE—DG Diffusion des Connaissances, 29 Rue Aldringer, Luxembourg (attn. Mr Emringer).

Chemical Group courses

The Aslib Chemical Group is proposing to hold a course on 'The nature and language of chemistry' at Courland Grove Hall, Courland Grove, London SW8, some time in April. The cost will be approximately £22.50.

The Group is also planning to hold a course on 'Polymer chemistry'—which proved so popular in 1969 but failed to attract more than four prospective students in 1970—providing enough declarations of support are received. Should it prove possible to go ahead, the course would probably take place around Easter, at a cost not exceeding £30.

Attendance at either of these courses is not necessarily restricted to the staff of information units or libraries of member companies. In order to finalize arrangements it is necessary to have expressions of support from a sufficient number of persons. If you are interested in attending, please write or telephone the Education Officer, Aslib Chemical Group, D. A. Heathcote, c/o Foster Wheeler Ltd, Foster Wheeler House, Chapel Street, London NW1 5DS. Tel.: 01-723 1221.

Marine Librarians' Association: 1st Annual Conference

The Marine Librarians' Association will be holding its 1st Annual Conference at Garnett College, Roehampton Lane, London, SW15, on 3rd, 4th and 5th January, 1973.

The programme will include an opening address by Rear-Admiral Sir Edmund Irving, KBE, CB, formerly Hydrographer of the Navy. There will be a visit to the National Maritime Museum Library, Greenwich, by invitation of the librarian, Dr Sanderson. The Marine Division of the Department of Trade and Industry will be sending two speakers to describe the 'Revised Instructions to Marine Surveyors' and discuss the need for a guide to current British legislative, regulatory and advisory publications in the field of merchant shipping. There will also be a visit from a team of Norwegian experts on information dissemination in maritime studies.

The conference is likely to be of interest to all librarians and information officers working in any branch of marine science. It is hoped that there will be ample time for informal discussion and exchange of views.

The cost will be £15 residential and £10 non-residential and enquiries should be addressed to Mrs Kathleen Van Haeften, Librarian, City of London Polytechnic, School of Navigation, 100 Minories, London, EC3N 1JY.

New services from Information Retrieval Ltd

From January 1973 Information Retrieval Limited are extending their existing range of ten monthly abstracts journals in the bio-medical sciences to include four new services: *Chemoreception Abstracts: chemical senses & applied techniques*; *Carbohydrate Metabolism Abstracts*; *Biological Membrane Abstracts*; and *Behavioural Biology Abstracts: Section A—Animal Behaviour*.

Chemoreception Abstracts, to be published quarterly, beginning in January 1973, is produced by IRL in association with the European Chemoreception Research Organization. *Behaviour Biology Abstracts: Section A—Animal Behaviour* will also appear quarterly (beginning in February 1973), while *Section B—Human Behaviour* is scheduled to begin in 1974. The remaining two services will be published monthly (beginning in January).

Further details are available from A. J. Woodcock, Marketing Director, Information Retrieval Limited, 1 Falconberg Court, London W1V 5FG. Tel.: 01-437 5362.

British Standard recommendation on the presentation of theses

In order to assist universities and colleges in drawing up regulations for the presentation of theses for higher degrees and other qualifications, the British Standards Institution has published BS 4821: 1972 *Recommendations for the presentation of theses.*

With the needs of librarians particularly in mind the Standard recommends that the paper size of the thesis should be A4, that it should be bound permanently between boards stiff enough to stand up on a shelf, and that it should be typed or printed in characters not less than 8 pt. It is also suggested that a declaration may be incorporated giving permission for libraries to take single copies for study purposes, and that certain specified identification information should appear on the spine of the work.

Copies of BS 4821 are available from BSI Sales Branch, 101 Pentonville Road, London N1 9ND, price 55 p.

Directory of collections on Latin America and West Indies

The Institute of Latin American Studies, University of London, is preparing a directory of libraries and special collections on Latin America and the West Indies, and a questionnaire has been sent to selected libraries. If any library with relevant materials (including material on the British West Indies) has not yet received a questionnaire, they are asked to contact: Bernard Naylor, University of London Institute of Latin American Studies, 31 Tavistock Square, London WC1H 9HA.

'Information sources about the EEC in the United Kingdom: 3. Law and taxation in the EEC and its member countries.' *Correction*

From W. A. F. P. STEINER. In the paper I read at the study session on Europe (*Aslib Proceedings*, vol. 24, no. 9, Sept. 1972, pp. 514–24) I stated (p. 514) that the candidate countries would become members of the European Economic Community and of the European Atomic Energy Community only, but not of the European Coal and Steel Community. This is incorrect, since they will become members of the Coal and Steel Community also. They will be members of the EEC and of the EAEC by virtue of the Treaty of Accession of 22nd January 1972, and of the ECSC by virtue of the Decision of the Council of the European Communities of 22nd January 1972 concerning the Accession to the European Coal and Steel Community. The procedure to be followed under the provisions of the Treaty differs in some respects from that to be followed under the provisions of the Decision. At the time at which this note is going to press, Norway must be considered not to be a candidate country.

Dr S. R. Ranganathan

We learn with deep regret that Shiyali Ramamrita Ranganathan, doyen of Indian librarianship, died on 27th September 1972, at the age of 80. For almost fifty years his work and personality have enriched the library profession. Trained as a mathematician, in 1923 he was appointed as the first librarian of the University of Madras. Even at that early stage of his career, links with this country were formed, for in 1924–25 he spent six months studying and working in England, and responded enthusiastically to the classification teaching of Berwick Sayers.

In 1931 Ranganathan published his first seminal book, *Five laws of library science*. The first edition of his *Colon classification* followed two years later. Since then, a stream of books and many hundreds of papers flowed from his pen. After retiring from university librarianship, he continued actively to teach and to investigate librarianship and documentation. His name and ideas are familiar throughout the profession.

This is not the time or place to evaluate these ideas. What we remember with gratitude and affection is the man. Even those who were unsympathetic to his theories acknowledged the quality of his mind and the passion of his devotion to the library as an educational force. The tremendous output of his writings—lucid, penetrating, sometimes enlivened by a charming misuse of English idiom—was inspired by a deep love of his people and concern for their future. For India, he wrote in 1948, 'there is urgent need for libraries . . . to blow up ignorance; to stimulate the blossoming of the personality of one and all of the citizens; to spread enlightenment across the length and breadth of the state'.

Ranganathan's writing was always a call to action. His 'five laws' look trivial, until we read them in this sense, and see that they are ideals that must ever be pursued. *How* are we to give every reader his book, every book its reader? *How* can we save the time of the reader? All the effort that he devoted to systematic exposition of subject analysis, cataloguing or administration was directed to these practical ends.

His intellectual strength was an ability to integrate a mass of closely observed detail into a rigorous intellectual system. His *Prolegomena to library classification* is a relentless search for meaningful subject sequences. Ranganathan followed the trail to the end, seeking principles at every step of the way. Sometimes, he said, the cynical part of his mind asked 'Who in the world wants all this theoretical stuff?' But he persevered in the belief that only basic principles could bring order into bibliographic confusion.

Even if the cynic in Ranganathan's mind were right, one thing will be remembered: his never-ending effort to persuade his people to bring alive the first law of library science—'books are for *use*'. The only memorial that he would wish is that his successors should work towards the same humanist goal.

The British Library ADP Feasibility Study

The report* on the British Library ADP study, published by HMSO in September 1972, runs to over six hundred pages of closely reasoned argument and, in view of its price, is unlikely to be extensively purchased by the smaller library and information units. The report will, in due course, be reviewed in the *Journal of Documentation*, but meanwhile members may be interested to read a fairly brief summary of its main proposals.

Since much of the study was carried out during a period when considerable uncertainty existed as to the future organization of the British Library, the authors have thought it appropriate to range more widely than the original brief would suggest and have considered the application of ADP, not only to the accepted services offered by the British Library but to a number of probable or possible services which they consider might be offered. In this sense the report is not just a study of computer applications but a blue print for the kind of national services which the British Library might provide although there is, of course, at this stage, no suggestion that it will in fact provide all or any of these services.

The report was submitted to the Department of Education and Science in November 1971 and since then many of the recommendations have been discussed in more detail and decisions made on some of the matters discussed. This should be borne in mind in reading the summary which follows, which is set out under the five major headings discussed in the report.

1. *The British Museum Library and the Science Reference Library*

This part of the report is essentially a study of the reference services of the BL and the major problems associated with acquisition, cataloguing and processing. Major recommendations include the adoption of a single set of cataloguing rules for the British Museum Library and the Science Reference Library based on the *Anglo-American Cataloguing Rules 1967*; the adoption of PRECIS for subject cataloguing and the production of subject lists; and the use of ADP for all current cataloguing. Retrospective conversion to machine-readable form of NRLSI'S post-1930 catalogue and of BML's post-1955 catalogue are proposed as later developments.

It is suggested that changes in administrative procedures would be needed in order to provide improved control over the flow of work, from arrival of material to subsequent processing. To this end a Placing and Streaming Unit would be created which would be responsible for the assigning of new items and for the creation of a Master Administrative Record to facilitate tracing of all books in process, to prepare the ground for later ADP processing and to yield management information.

---

* Department of Education and Science. The scope for automatic data processing in the British Library: report of a study into the feasibility of applying ADP to the operations and services of the British Library. London, HMSO, 1972, 2 vols. £20.00.

2. *Bibliographical Services Unit*

A hypothetical Bibliographical Services Unit is proposed to carry out bibliographical functions of the British Library and particularly to be responsible for producing bibliographical records for materials emanating from the UK as well as for materials acquired by the BML and SRL. Adoption of the *Anglo-American Cataloguing Rules* by the British Library would enable the BL to integrate its internal cataloguing with the production of BNB, and the introduction of ADP to the cataloguing processes of the BML and SRL would make possible the use of computer-produced records for a high percentage of their intake.

It is also suggested that the extension of BSU activities to other UK material would permit additional machine-readable or hard-copy records to be provided for other libraries and enable SDI and retrospective searching services to be offered, the cost to be recovered from the users of such services. A market study should be carried out to ascertain the likely demand for such services.

A major recommendation under this heading is the production in machine-readable form of a comprehensive file of serials in the British Library, from which both comprehensive and selective lists of holdings could be produced. This would be a major national tool as well as a contribution to the International Serials Data System, and it is suggested that the recommendation should be given high priority.

3. *Lending services*

It is suggested that the central lending stock (i.e. of the combined NCL/NLLST) should be extended to cover all current worthwhile English language monographs in all subjects and all worthwhile serials in all subjects ('worthwhile' is not defined). This would provide better coverage and faster service for heavily used categories of material and reduce the need for union catalogues.

There are a number of recommendations relating to Union Catalogues, which appear to overlap to some extent. Essentially it is suggested that the following should be provided:

(a) A single author/title catalogue covering the monographs held in the Lending Unit, to which will be added entries for foreign language and older English language material currently acquired by a limited number of those libraries which now send such entries to the Regional Library Bureaux and the NCL union catalogues. This author/title catalogue would be computer maintained.

(b) A machine-readable numerical union catalogue, based on ISBN numbers, recording the location of current UK and USA monographs in all major libraries (but excluding the holdings of the Lending Unit).

It is suggested that the provision of such catalogues, coupled with central reporting, the centralization of existing Regional Bureaux Catalogues and the possible conversion to machine-readable form at a later stage of the present NCL union catalogue would eliminate many of the present delays as well as reducing total costs.

To make the service more effective it is recommended that the BML and SRL should supply, as a routine service, copies of all serial articles requested on inter-library loan that are not available in the Lending Unit and that they should also be prepared to lend non-copyright material for which locations are not found in the union catalogues.

4. *Special categories of material*

There are a number of recommendations relating to special materials, covering conference proceedings, official publications, printed and recorded music, maps, manuscripts, theses, patents, translations and non-book materials.

The most important of these are:

(a) that a computer-based index to conference proceedings should be established to replace the indexes at present maintained by the NLLST and the NCL. From this a published *Index* with annual accumulations could be produced;
(b) that the British Library and the DTI Reports Centre should co-operate in the production of MARC-compatible records for UK reports;
(c) that all UK official publications should be fully catalogued and that in particular a retrospective catalogue in machine-readable form should be maintained of material issued by UK government departments and public bodies which is not published by or through HMSO;
(d) that the Lending Unit should acquire all non-UK items listed in the HMSO catalogue;
(e) that the British Library should assume responsibility for ensuring that adequate records, using ADP and MARC formats, are created for all currently produced UK non-book materials.

5. *Other ADP applications relevant to the British Library*

This section is somewhat more speculative than the rest of the report and no formal recommendations are made. Its chief interest lies in the discussion of the information which will be needed by the management of the British Library about its own operations and how this can be provided by the ADP system.

Only the major recommendations in the report are summarized above, and for obvious reasons, these are chiefly concerned with the ways in which ADP could be used to solve the very considerable operational problems of the British Library, and particularly those of the BML. These are dealt with in greater detail in a set of eight papers, produced by members of the study team, which appear as Appendices to the main report, and which are valuable in themselves for the analyses which they provide of these problems.

For those who wish to delve further, a copy of the report is available for reference in the Aslib Library.

BRIEF REVIEWS

CALDERHEAD, PATRICIA. Libraries for professional practice. London: Architectural Press, 1972. 127 pp. £3.75. (ISBN 0 85139 565.)

This book is a reprinting of a series which appeared some years ago in *Architects Journal,* revised, updated, reset and largely re-illustrated. The *Architects Journal* has for many years promoted an interest in architects' libraries and techniques relevant to these services. The collection contains five 'Practice studies' arguing the case for office libraries and presenting descriptions of the S&B, UDC and CI/S&B classification schemes: and ten information sheets on such topics as 'How to obtain information' (which surprisingly omits to mention Aslib as a source), 'Space requirements and layouts' and four on equipment and accessories.

CARTER, ROBERT. Communications in organizations: an annotated bibliography and sourcebook. Detroit (Mich.): Gale Research Co., 1972. 272 pp. $14.50.

This primarily utilizes material from books and periodical articles, but also from films and other media. Two kinds of users are envisaged: the practician and the student of communication, and the librarian or information officer. The bibliography is divided into nine main sections: (1) Theories and systems of organizational communication; (2) Barriers to organizational communication; (3) Vertical communication; (4) Horizontal communication; (5) Organizational change; (8) Evaluation of the effectiveness of Organizational Communication; (9) Sourcebooks and articles. In each section the entries are arranged by date of publication. Indexes of periodical addresses, publishers cited, names, titles and subjects make up the final sections of the work.

CHEMICAL & PLASTICS INDUSTRIES REVIEW 1972. Epping (Essex): Gower Economic Publications, 1972. 356 pp.

This publication contains a mass of economic information about the United Kingdom chemicals and plastics industries. Analyses are given to the performance of these industries from 1965 to 1970 and forecasts are made for the period to the end of 1972. The structures of the industries are described in terms of their size, place in the national economy, their position relative to the industries of other industrialized nations, the major companies involved and the geographical location of plants. There are analyses of the industries in terms of growth in output, changes in the patterns of employment, costs, prices and profitability in terms of investment. International comparisons are shown between British companies and such countries as the United States, Japan, West Germany, France, and Italy. A general survey of the performance of various sectors of the chemicals and plastics industries is included, as well as a more detailed analysis of particular sections.

The second part of the publication is concerned with the major companies operating in the chemicals and plastics industries in Britain. One page is devoted to each of the top one hundred companies which are ranked by turnover. Basic information given includes recent trading results of the company, usually up to 1970, the address of the registered or head office, names of senior management and a short profile of the company. The final section of the book is a depth analysis of twelve of the larger publicly quoted companies in the industries, covering aspects such as group structure, product range, investment rating and financial record.

There are many tables and graphs in the review. Only an indication of the source of statistical information is usually shown: it would have been useful if full bibliographical details of the source had been included. There is a contents list but no index.

CONFERENCE PROCEEDINGS IN THE IAEA LIBRARY (received 1957–1971). Vienna: International Atomic Energy Agency, 1972. 561 pp. £4.70. (Available from HMSO, PO Box 569, London SE1.)

The first section of this publication lists, initially by place, then by date, some 5,744 conference proceedings published in books, reports or journals. Each entry also includes the conference title and the location in the IAEA library. The second section consists of a KWIC index with the place and date of the conference. All conferences received by the library from 1957 to September 1971 are included.

The foreword to this publication claims that 'the purpose of the list is to assist members of the IAEA staff and co-operating libraries to identify conferences, congresses, meetings, symposia and training courses relating to nuclear science and technology, and to locate the proceedings'. There is no doubt that a great deal of information is gathered together in this volume which may not be available elsewhere, or would at least be scattered in a variety of sources. However, as with any publication that is directed at helping a specialized clientele, it lacks certain information which would prove very useful in a wider context. For example, while it is useful to know that proceedings of a conference have been published one would have hoped that the sponsors, and publishers of books, would have been included and that some indication of availability, particularly of report literature, such as that provided by *Nuclear Science Abstracts*, would have been given.

ROBERTS, M. J. *and others*. Construction Industry Thesaurus. Development edition. London: Department of the Environment, 1972. 341 pp. (Available from Polytechnic of the South Bank, Brixton.)

This thesaurus was originally commissioned by the Construction Industry Research and Information Association, but subsequently the grant to the project was increased by the Department of the Environment who recognized it as being particularly relevant to the studies undertaken for the National Consultative Council Working Party on Data Co-ordination. It was the hope of this working party that the thesaurus could operate both as an indexing language for post-coordinate systems and as a standard terminology to improve communication. After reviewing this development edition the Working Party considered it satisfied the first aim but more work was needed if the second aim was to be achieved. The thesaurus is similar to the Thesaurofacet in format and contains some nine thousand terms.

The work was undertaken at the Polytechnic of the South Bank (formerly the Brixton School of Building) and with direction from the Polytechnic of North London (formerly the North Western Polytechnic). The official edition is expected to contain about twelve thousand terms and it is hoped that it will appear in mid-1973.

VAN BOL, JEAN-MARIE *and* FAKHFAKH, ABDELFATTAH, *comps.* The use of mass media in developing countries. 2 vols. Brussels: International Centre for African Social and Economic Documentation, 1971. 751 pp. 1000 BF. *Bibliographical Enquiries No. 1.*

This bibliography comes in two volumes, of which the main body consists of a listing, alphabetical by author and with running numbers, of the references. Each reference contains full bibliographical details plus an annotation in French followed by an English version, and a classification number relating to the subject plan at the front of the first volume.

This 'analytical plan' is the only subject guide to the references. We are first presented with an outline of the scheme (the basis of which is not given) which provides numbers and the subjects in French and English allotted to them, from General Theory at 0 through Press, Radio, Cinema, Television and all their ramifications, to Miscellaneous at 9. After this the plan is repeated in the same order, this time giving the numbers of the references relevant to the classification numbers.

The subject breakdown is preceded by the introduction, which is presented in parallel French and English texts and includes 'parameters of time, location sites of material and language which it is indispensable to set out for a consultant. . . .' One is able to extricate from this the facts that the time span for books covered is from about 1950 to 1969, and for some of the periodicals also from 1950 to 1969, while others cover the period 1960–1969—details are given in the list of periodicals covered. Also linguistic limitations exist in that the original languages of articles are French, Dutch, English, German, Italian, Spanish, and Portuguese.

Following the subject breakdown is the list of periodicals and the locations in Belgium where they were consulted. After this come the references; the first volume ends with IZZIDIN and the second volume begins with JACOBS, although according to the cover volume one contains references A–J and volume 2, K–Z.

After the references comes a geographical index, organized alphabetically by country in French; this is followed by an alphabetical index to the preceding index, by country, in English.

'Contributing institutes' are listed next, and the whole work is concluded by a contents table.

However, the potential buyer of this bibliography should not let himself be put off by its rather low standards of production and translation, an indication of which is given by the inclusion of a seven-page Addenda and Corrigenda to the analytical plan and the text: once the user becomes accustomed to the classification scheme he should find this a useful bibliography in the field of mass communications.

Thesaurus reconciliation

H. H. Neville

Building Research Establishment

Paper presented at the Annual Conference of the Co-ordinate Indexing Group, Churchill College, Cambridge, 12th–14th April 1972

SUMMARY

The technique of reconciling two or more thesauri is explained and demonstrated with examples from two actual thesauri which are currently being reconciled to form an international co-operative indexing system in the field of building science. Reconciliation results in the addition of code numbers to the keywords in each thesaurus and the insertion of additional 'USE' references, which enable any material indexed with the keywords of one thesaurus to be incorporated in the indexing system based on the other thesaurus without re-indexing. The original thesauri can continue to be used locally as they were before reconciliation, since the keywords themselves remain unchanged and none are added or deleted. The reconciliation process is independent of thesaurus structure.

THIS TALK arises from a paper published at the end of 1970[1] in which the basis of a method of reconciling thesauri was proposed. This method has meanwhile been applied to a pair of actual thesauri, one French and one English, in the field of building science. This project is not quite completed but several thousand keywords have been reconciled without meeting any insuperable problems, and it was thought that a practical explanation of the technique might be of interest.

What is meant by reconciliation? If two or more organizations regularly index the same sort of literature, each using a different thesaurus, no interchange of indexed material between their systems can take place without re-indexing, since the keywords of the various systems are not compatible. If we suppose that the organizations wish to co-operate but do not want to adopt a common thesaurus or to change their existing systems, then the reconciliation technique offers a means of converting keywords from each system into the corresponding keywords of the other. The method requires the use of code numbers for the concepts represented by all the keywords. These numbers have to be written into each thesaurus, and certain additional entries ('USE' references) have to be inserted into each thesaurus, but none of the existing keywords needs to be changed or deleted, and no new keywords need to be added, nor are the existing relations between keywords affected, so that the original systems can continue to be used locally, exactly as they were before reconciliation.

The method is based on the assumption that it is concepts that are being indexed, the keywords being labels or tags allotted to concepts. The problem is simply that a given concept may be tagged differently in different thesauri. This distinction between keywords and concepts is essential to the application of the reconciliation method. Let us take an example from the thesauri being used in the current project. The French thesaurus has a keyword CORPS POREUX. There is in this case no difficulty in identifying the concept which underlies this keyword and the straightforward English translation 'porous body' is an accurate equivalent. However, the term 'porous body' does not appear as a keyword in the English thesaurus. Investigation of the English system reveals that the concept 'porous body' would be indexed with the keyword POROSITY. We cannot conclude that CORPS POREUX and POROSITY are equivalent keywords, because the French thesaurus contains also the keyword POROSITÉ, which is also represented by the English keyword POROSITY. Thus we are dealing with two concepts, represented in French by separate keywords, and in English by a single keyword. Since there are two concepts, we have to use two code numbers and we have to arrange matters so that in switching from French to English both code numbers lead to the same English keyword, whilst in switching from English to French only the correct number is used in any particular instance.

The code numbers are used, therefore, to identify concepts. Each numbered concept is represented by a keyword in at least one of the thesauri. If a numbered concept is represented by a keyword in each thesaurus, then the two keywords are exactly equivalent; if a numbered concept is represented by a keyword in only one thesaurus, then it must be represented in the other by a 'USE' reference which leads to the appropriate keyword or combination of keywords.

It is appropriate at this point to say a word about thesaurus structure. Thesauri may be structured in various ways, ranging from a simple listing of keywords with 'USE' references for synonyms and other lead-in terms, to a complex network of indications of broader, narrower, and otherwise related keywords displayed in various ways, or a formal classification of the keywords. Whatever form the structure may take, its ultimate purpose is to help the indexer and the searcher to find the most appropriate keywords to use at any time. Once the keywords have been chosen, either for indexing an item, or for formulating a search, the structure has served its purpose. When exchanging indexed information between systems, we are handling chosen keywords, and the reconciliation process is therefore independent of thesaurus structure. Furthermore, and this is essential to the understanding of the method, the code numbers used to identify concepts are used as identifiers only; the numbers are not and cannot be related to each other in any way.

Let us now see how the reconciliation technique works in practice. There are two stages. In stage 1 we take one of the thesauri—the French one in our case—and consider each keyword in turn, in any convenient order. We have to identify the index concept underlying each keyword and give it a number. This is not merely a matter of translating the keyword into English, nor of arriving at its 'meaning' in the ordinary sense of that word, but of discovering the concept for which the keyword is used as a label in the French indexing system. We then consider how this concept is indexed in the English system. If there is an exactly equivalent English keyword, it is given the same number as the

French keyword. If no exact equivalent exists, appropriate 'USE' and 'USE FOR' entries are written into the English thesaurus. At the end of stage 1 all the French keywords will have been numbered, and equivalent English terms will exist in the English thesaurus, either as keywords, which will have received their numbers, or as non-keywords (which will also be numbered) with 'USE' entries. The English keywords which have not been directly equated with French keywords will remain un-numbered. In stage 2 these residual English keywords are given numbers and reconciled with the French thesaurus.

It may be asked whether working with two languages makes the reconciliation process more difficult. Imperfect knowledge of the foreign language does of course introduce an added difficulty, but this can be overcome by consultation between the parties. The problems that arise in reconciling keywords in different languages are essentially of the same kinds as those which arise when only one language is involved. For instance our French thesaurus has the two keywords PERÇAGE and FORAGE, which both appear to mean 'drilling'. Recourse to dictionaries did not solve this problem, but consultation revealed that PERÇAGE was used to denote the drilling of metal, wood, etc., and FORAGE to denote the drilling of boreholes. Our English thesaurus uses only the one keyword DRILLING for both purposes. (The English language has also the word 'boring', but the difference between drilling and boring is not the same as that between *perçage* and *forage*, and in any case our English thesaurus takes no account of such differences and uses the keyword DRILLING to cover all forms of hole-making.) Reconciliation requires the recognition of the fact that the English keyword DRILLING has two meanings in relation to the French:

PERÇAGE = drilling (workshop), USE DRILLING
FORAGE = drilling (boreholes), USE DRILLING

The reciprocal 'USE FOR' entries take the form:

DRILLING
UF drilling (workshop) = PERÇAGE
drilling (boreholes) = FORAGE

From the point of view of reconciliation the problem is that of homonymy and is dealt with in the same way as it would be if it occurred in a single language. The word DRILLING is in effect a pair of homonyms which have to be separated. The homonymy only appears when the word is considered in relation to the French thesaurus. The same situation arises in a single language if, for example, one English thesaurus has the keywords ROD and REFRESHMENT COUNTER and another thesaurus uses the single keyword BAR to represent both concepts.

Let us now carry out the reconciliation of a few keywords selected from the French and English thesauri. Table 1 shows the relevant words extracted from the thesauri as they appeared before reconciliation. (Related terms and other matter have been omitted, and the words are listed in the order in which they will be described.)

TABLE 1: *Extracts from the French and English thesauri before reconciliation*

FONDATION	FOUNDATIONS
FONDATION SUR PIEUX	piled foundations, USE FOUNDATIONS + PILES
ARC	ARCHES
CORPS POREUX	
POROSITÉ	POROSITY
PERÇAGE	DRILLING
FORAGE	
niveau sonore, USE AMPLITUDE+ SON	SOUND LEVEL

Stage 1

The first French keyword is FONDATION. We give it the number (1) and we find that there exists an exactly equivalent English keyword FOUNDATIONS. There is no problem at all here and we can therefore add the same number to the English keyword.

The second French keyword, FONDATION SUR PIEUX is given the number (2). The English equivalent, 'piled foundations', exists in the English thesaurus, but only as a USE reference leading to FOUNDATIONS+PILES. There is again no problem. The English equivalent is given the number (2), and the equivalent terms are added to the two keys to code numbers. Note that the English term appears against its number in lower-case, because it is not a keyword. The third French keyword presents a problem because it turns out that ARC covers two concepts: the architectural term 'arches' and the geometrical term 'arcs'. The former appears as a keyword in English, whilst the latter is not provided for in any way in the English thesaurus. This is a homonym problem combined with the problem of a lacking equivalent. The French homonym is dealt with by giving it two numbers, (3) and (4), and indicating to the French indexer how to choose between the numbers. The keyword is entered twice in the French numerical key with the appropriate annotations. For the architectural sense of the word a direct English equivalent exists in the English keyword ARCHES, which is therefore numbered (3). The lacking equivalent for concept no. 4 is dealt with by writing into the English thesaurus a 'blind' entry **arcs** (4), i.e. a non-keyword entry which does not show a USE reference. The effect of this is that any indexed material received from France bearing the code number 4 (presumably among other numbers) cannot be indexed with that concept in the English system. It may be regarded as a defect of the English thesaurus that this concept was not included in its compilation, but it is not the purpose of reconciliation to correct defects.* The defect has been preserved but nothing has been lost by reconciliation, and above all, the defect has not been imposed on the French. It is to ensure this that the blind entry has been inserted, so that an English indexer is made aware of the existence of the concept 'arcs', and of its number, for the sake of the French system, although it is not usable in his own local system.

---

* The blind entry is not the only way of reconciling the situation; see reference 1.

The next French keyword is CORPS POREUX, which was discussed earlier. There is no equivalent in the English thesaurus, but consultation reveals that this concept would be indexed with the keyword POROSITY. This situation must now be made explicit by inserting the USE reference **porous bodies (5), USE POROSITY**, and the reciprocal USE FOR reference under the existing keyword POROSITY. The next keyword POROSITÉ can then be equated with POROSITY, both numbered **6**. It was said earlier that these two terms were not equivalent, but the English one has now acquired the UF reference with a different number, which makes it clear to an English indexer that if he wishes to use the term POROSITY he should add the number 5 rather than 6, when he is dealing with the concept 'porous bodies' rather than with 'porosity'. For local use the keyword POROSITY will be used in either case, but for international exchange the correct choice of number will ensure that the appropriate French keyword is used in France.

The last two French keywords, PERÇAGE and FORAGE, have already been discussed. Their reconciliation with the single English keyword DRILLING is achieved by splitting the latter into two quasi-homonyms numbered 7 and **8**.

Stage 1 is now complete, all the French keywords in the extract having been dealt with (see Table 2). The French term 'niveau sonore' is not a keyword. The terms AMPLITUDE and SON are keywords in the French system but appear as independent entries elsewhere in the thesaurus, and would eventually be dealt with if we had time to put the whole thesaurus through stage 1. For the purpose of the present demonstration we can now proceed to stage 2, where we are left with only one English keyword unreconciled, viz. SOUND LEVEL, which would escape treatment in stage 1 even if the whole French thesaurus had

TABLE 2: *The thesauri as they appear at the end of stage 1, with the key to code numbers compiled for each. (All additions resulting from stage 1 are shown in bold type.)*

FONDATION (1)	FOUNDATIONS (1)
FONDATION SUR PIEUX (**2**)	**piled foundations (2)**
	USE FOUNDATIONS+PILES
ARC (**architecture 3**) (**géometrie 4**)	ARCHES (**3**)
	arcs (4)
CORPS POREUX (**5**)	**porous bodies (5)**
	USE POROSITY
POROSITÉ (**6**)	POROSITY (**6**)
	UF porous bodies (5)
PERÇAGE (**7**)	DRILLING (**workshop 7, boreholes 8**)
FORAGE (**8**)	
niveau sonore	SOUND LEVEL
USE AMPLITUDE+SON	
1 = **FONDATION**	1 = **FOUNDATIONS**
2 = **FONDATION SUR PIEUX**	2 = **piled foundations**
3 = **ARC (architecture)**	3 = **ARCHES**
4 = **ARC (géometrie)**	4 = **arcs**
5 = **CORPS POREUX**	5 = **porous bodies**
6 = **POROSITÉ**	6 = **POROSITY**
7 = **PERÇAGE**	7 = **DRILLING (workshop)**
8 = **FORAGE**	8 = **DRILLING (boreholes)**

TABLE 3: *Extension of Table 2 to show the result of stage 2 of the reconciliation*

niveau sonore (9) USE AMPLITUDE+SON	SOUND LEVEL (9)
9 niveau sonore	**9 = SOUND LEVEL**

been covered, because there is no equivalent French keyword. There is, however, an equivalent French non-keyword entry 'niveau sonore'. Table 3 shows how this step is carried out, and this is all that needs to be done to complete stage 2, as far as this small extract from the thesauri is concerned.

To illustrate the reconciled system in use, we may consider the indexing of an item of information about 'drilling piled foundations for arches'. A French indexer would use the keywords FORAGE, FONDATION SUR PIEUX, and ARC for his local system. For international exchange he would use the numbers 8, 2, 3. The first two numbers are the only possible ones for the keywords concerned, whilst the third number is the result of the choice between 3 and 4 offered by the reconciled French thesaurus.

An English indexer faced with the same item would use the keywords DRILLING, FOUNDATIONS, PILES, and ARCHES, for his local system. For international exchange he would allocate the numbers 8 (choosing this for DRILLING rather than 7), 2 (shown in his reconciled thesaurus as appropriate for FOUNDATIONS+PILES when 'piled foundations' is intended) and 3 (the only number available for ARCHES which in the English system is unambiguous).

Thus the same set of code numbers has been produced from each thesaurus, although the two sets of keywords are not directly compatible. If this set of numbers is referred to either of the two numerical keys, it will be seen that they lead to the correct keywords in either system, either directly or via a USE reference in the appropriate thesaurus.

When two thesauri have been reconciled, another one may be added to the system. In such a case stage 1 would be undertaken by the new participant who would interpret all the existing code numbers, using whichever of the two numerical keys he likes, into his own keywords. Stage 2 would involve reconciling the residual keywords of the new thesaurus with each of the two original thesauri in turn. The third thesaurus is not likely to contribute many new concepts to the joint collection from the first two thesauri, so that stage 2 would probably not involve much work. The main burden would arise in stage 1 which would fall to the new participant to carry out.

Once a joint system is established, participants can add certain keywords to their systems if they wish, without consultation. Any concept which exists as a numbered item but is not a keyword in one of the thesauri may be upgraded to keyword status in that thesaurus without invalidating the joint system. Thus in Table 2 'piled foundations' is not a keyword in the English system, but has a code number because it is a keyword in the French thesaurus, and it can therefore be turned into a keyword in the English system by merely writing it in capital letters and deleting the USE reference. The addition of new keywords which do not correspond to existing numbered concepts can be done only by joint action by all the participants.

The examples given in the tables represent the most commonly occurring types of incompatibility. There are some others which can arise and these have been discussed elsewhere.[1]

Acknowledgments

The work described has been carried out as part of the Research programme of the Building Research Establishment of the Department of the Environment and this paper is published by permission of the Director.

REFERENCE

1 NEVILLE, H. H. Feasibility study of a scheme for reconciling thesauri covering a common subject. *Journal of Documentation*, **26**, 4, December 1970, p. 313–36.

Looking at libraries

P. A. Thomas

Aslib Research & Development Department

Paper presented at an Aslib evening meeting, 11th April 1972

WHEN I first joined Aslib I was asked how I felt about visiting different libraries and watching the people at work in them. The idea appealed to me, particularly as I had already found out how co-operative librarians could be when working in a library myself, and beset by problems of re-organization. Whatever the public image of librarians may be, the characteristics that have impressed me most are an absorbed interest in their work, and a willingness to talk about it. This helped me enormously, as my job has been to find out about their jobs. The librarians I have met through my work at Aslib have all been friendly and helpful, and interested enough in research to let me loose in their libraries in order to talk to their staff at some length about the various processes used.

I have learnt a good deal about the job of watching other people work, particularly the fact that it involves hard work for the watcher and questioner. It is surprisingly difficult to describe the details of one's everyday job to someone, especially if they are not familiar with local conditions. If you have ever tried to teach someone to drive, you will recognize some of these difficulties. Or if you try to flowchart any of your activities: it is very easy to leave out essential details in a first attempt, and the final catalogue of ifs and buts can be quite extensive.

We very quickly learn the necessary sequence of actions required to cope with recurring situations, and as it were pass control to a semi-automatic pilot, leaving the main areas of consciousness to cope with new problems, or to day dream. The performance programs set up in this way are then rarely questioned unless they break down, or unless someone comes along and starts asking awkward questions—as the centipede found out.

Tonight I am in a somewhat similar position to that of the patient librarians I have quizzed in the past. I want to tell you something of *my* work in the last four years, and perhaps persuade some of you to analyse your own library procedures. Organizations evolve through time, and a surprising amount of history can get embedded in daily routines. With the increasing need to make the most of limited resources, applied common sense can cut out unnecessary tasks, and combine and re-sequence others to make more effective use of staff and equipment.

The techniques of Organization and Methods (or O & M) and work study have proved their usefulness to many managements and, under a variety of names, from 'O & M' to 'Computer feasibility studies' and 'Operations Research', have established themselves in Management Services Departments in an increasing number of organizations.

Besides the immediate gains of rationalization and streamlining of existing work processes, the questioning technique and analytic approach common to these various disciplines are basic to the design of new methods or systems. For an organization to survive the rapid technological advances of this century it must plan ahead with even more care than in the past. We need to encourage more flexibility and a willingness to accept change and innovation.

There is scope for continuing O & M studies in most organizations, and libraries are no exception. The clerical work content of librarianship has been put at around 80 per cent—and there are certainly a lot of people in libraries spending much of their time in writing, or typing, or punching information from one form to another and filing and refiling the results. There seems to be an instinctive need to record each and every action, and having recorded it, to file it in case it should ever be required. Perhaps it is the conservationist aspect of librarianship: perhaps because it is so often difficult to point to the results of a day's work. The books have moved on and an empty shelf is not enough (and is anyway probably already filled with tomorrow's quota of books). A cabinet drawer full of processed records is tangible proof of time well spent.

The emergence of the BNB/MARC machine-readable catalogue entry aroused our interest in the present use of bibliographic information in libraries. We wanted to know what bibliographic records were used and how they were used, before we could start relating their content to their functions, or criticize the contents of the standardized communication format of MARC. My objective was to find out how forms were used. I was not at this stage questioning why they were used in this way, nor was I suggesting alternative procedures. A bibliographic description has many uses in a library besides that of a catalogue entry. The paper work devised and maintained by library staff in support of the routine procedures in getting, processing, and using books is all based on bibliographic descriptions.

I visited a number of libraries, of different types and sizes, and traced the use of any piece of paper that contained a reference to a specific book. This included official-looking printed forms, stencilled and duplicated forms, and odd bits of scrap paper with anything from the fullest cataloguing details to a lone accession number. I talked to the staff who used these, and collected sample forms and information on all the files they could be put in. I have the biggest collection of library forms in the country—I haven't decided yet when I should throw them away. They might come in useful again!

I spoke to each person at some length to discover the sequences of activities involved in each of the routine procedures—and found some odd communication problems. Even within the library profession, procedures, forms and activities go by different names and the biggest difficulty is when the same names are used for different things. I found that it was safer not to assume I knew what was meant by even the simplest statement. At the risk of appearing very stupid I questioned everything, including the numerous heaps of forms paper-clipped or pinned together that I saw on each person's desk. Then I went away and wrote a narrative of the procedure and drew a flowchart to go with it. I returned to the library staff and checked each stage again.

This seems only fair in any exercise of this kind; the victim should at least get a chance to see what the interviewer says they said and the final result is more likely to be correct. One of the most usual difficulties is in getting the *sequence* of actions right, and a double (or treble) check helps to ensure that anything left out the first time, under the pressure of questioning gets into the final version.

Also, people seemed interested to see what their activities looked like diagrammed, and some were obviously itching to re-arrange things even before I was out of the door. This, and the fact that no organization is, or should be, static meant that by the time I sent copies of the notes and diagrams to the library, they were quite often eager to tell me they were out of date.

In an exercise of this type this is inevitable. You can hardly expect the world to stand still for you to paint its portrait. The best that can be done is to dash around taking a series of snapshots, or time-slices from various angles. Indeed, one of the functions of an internal O & M exercise is to provoke this very change. From the biblio-records viewpoint, the important thing was to find out what was happening, and then to abstract a generalized picture rather than to faithfully reproduce every individual library's procedures. In spite of adaptations the original libraries still used forms with bibliographic information on them to accomplish the basic procedures all libraries must engage in—and it was these basic procedures that I was tracking down.

It was clear that there were eighteen procedures common to all the different types of library I visited. There were of course local variations: for instance, in a procedure I call 'list', anything from a new accessions list to an annotated bibliography can be produced, and you all know what different things cataloguing may mean in different libraries. Nevertheless, if you look at a procedure as an action, there are only a limited number of stages of activity possible, and these are most often accomplished with the help of forms. These stages I have called 'initiate', 'authorize', 'activate', 'record', 'report' and 'cancel'. Something (most often the receipt of a book or a form) starts the action off. Very often, you need someone's signature or initials to show the action is authorized. You perform the action, record the fact that you have done it (probably by adding your initials, or a date, or a tick to a form and filing the result), you tell someone you have done it (either directly, or implicitly by passing the processed books on to the next stage). Finally you may try to undo the effects of your action if it was wrong, or is now irrelevant.

Analysis of the use of forms in relation to these activities shows their underlying coincidence of purpose or function to be the accomplishment of the eighteen procedures. They are the tools of the trade by means of which books are obtained, processed, and made available to the users. Very little is done in a library without filling in, annotating or filing and refiling a form. If you can reduce this paperwork, you are directly affecting working methods, and should be able to free more staff time from the routine housekeeping procedures to readers' enquiry and bibliographic research work. A library will not of course have the same number of forms as another, nor will they be the same shape or colour. They will not have the same name (even from one department to another in a large system) nor will they have the same content. Most important of all, they are not used for the same combination of activities and procedures. However, the eighteen common procedures must be accommodated, and present practice seems to be much more a result of accident and local tradition, than a conscious attempt to find the more effective combinations.

Having sorted out the procedural framework, and varying combinations of procedures accomplished by single forms, it was tempting to assume that any information not used at one stage in a procedure, would be used later. To investigate this further it seemed necessary to detail a further level of operation, which I have called the task level. Task words refer to the elementary actions on the elements of information and the forms themselves. For instance, information is *entered* on a form, and the form is *placed* in a file. I have listed fifteen of these tasks to cover activities observed so far. Even so, it is still not easy to explain the use of the various elements. The use of information is one of the most complex human activities, and the use of bibliographic information in library systems is a good example of this. The form itself and its position in the system often contributes as much information as its content: in Marshall McLuhan's terminology, 'the medium is the message'. In addition to elements of administrative information which play just as important a part as the bibliographic description, further information is supplied by the user of the form, the knowledge a person brings to his job. A member of the library staff, a bookseller and an accountant will derive very different information from the same order form—and a librarian will react differently to the same form at different times: for instance, an on-order form can become a record of receipt, with the date and invoice number added. More often than not it is still only possible to explain the need of certain elements of information by saying 'it helps, yes I need it'.

The actual use of that most familiar bibliographic record, a catalogue entry, is not wholly defined by its content. Users of catalogues bring different approaches and different needs, and little is known of the contribution of the various elements of information present in the satisfaction of these needs. The questions catalogues have been consciously designed to answer have been necessarily broad in scope and the information aimed at answering them is, basically: author, title, classmark or subject heading. Success in finding an entry depends not only on the quality of the catalogue, but on the information the user brings with him. Additional help is afforded by such things as series titles, editions, dates of publication.

How much help is provided by these, and by other information presented, is a matter of speculation. In one American university it was found that a number of students did not even know what some common abbreviations on catalogue cards meant. There have been many catalogue-use studies, but it seems the best we can hope for is better instruction programs for users on how to use whatever information we present them with.

We learn more about the operation of our systems through analysing them, and can hopefully learn to design more effective ones—but there is still not a complete answer. The intuitive and implicit aspects of language and human behaviour do not allow the most analytical and objective techniques of observation and analysis to be free of their effects. It is well known that you cannot observe a situation without affecting it in some way. This is why work study experts take more timings than one would think necessary before arriving at a standard time—the idea is to let the operator settle down to the fact that he is being watched in the hope that the later timings will be less affected by the wish to impress the observer, or by sheer nervousness at being so closely observed.

I have already mentioned communication problems. The difficulties of describing one's routine activities in full and consistent detail, even to a fellow librarian, should not be underestimated. The thread of essential information needed here must be elaborated with additional information to communicate across the various barriers of language and background. Each person's perception of the universe is unique, and communication, even with people within the same organization, can be a very real problem—as all new boys discover, and then forget as they gradually absorb information about the organization and their own work group. Moreover, when backgrounds and training differ, and when varying professional jargons are used, it is very much more difficult.

It would be interesting to see what sort of description of library procedures would be obtained by a non-librarian restricted to observation only, and not allowed to draw on an existing background knowledge of library concerns nor to question the observed on their actions.

An approximation to this situation is likely to face more and more librarians. Real two-way communication with computer personnel is essential if the beautiful new automated library procedures are to be of any use to the librarian. The five basic O & M questions I was concerned with—the who, what, where, when and how of library procedures, will provide the investigator with enough information to reveal the more significant aspects of his environment. The sixth, and to a designer the most vital question, the 'WHY is this done at all', is the question that the individual librarian seeking to improve his own library's procedures must ask, followed of course by why this person, why here, why now, and why this way. It is also the question most likely to raise a defensive reaction.

Mr Schofield, of the Library Management Research Unit at Cambridge spoke at an Aslib evening meeting earlier this year, of the RC factor, the resistance to change. Even apparently insignificant changes in a clerical routine can change the conceptions of the operator of his job. This can work in one of two ways. The change may be seen as enhancing the job—or it may be resisted as a change for the worse. The exponents of the RC factor say the response is more likely to be one of suspicion, and this can wreck the working of a new method, as many an enthusiastic O & M man has found out. The easiest way to encourage an atmosphere where change is accepted is to involve the staff in planning the changes. An additional bonus is that the new method so planned is likely to be a better solution, as it is based on the particular knowledge and experience of the people who have to do the job anyway. The more and the earlier the involvement of staff in planning and preparing a new method or system (manual or computer-based) the more likely they are to make it work.

In an attempt to find out if the questioning provoked during the preparation of computer-based procedures could help me to define the use of the individual elements of information more clearly, I spent last summer watching the progress of Southampton University Library. I analysed both manual and computer parts of their systems. The automated circulation system has been in operation since 1967, and new acquisitions and cataloguing systems are being developed. The basic procedures still need to be accomplished, and the information will still include bibliographic and administrative elements. There is also, of course, a great deal of work involved in preparing the information for input to the computer and in coping with the outputs—for the most part, large sheets of computer printout, a new breed of form, and just as subject to annotations and filings as our other forms.

Information must be made explicit for computer manipulation, but the use of the information still depends on human interpretation, implicit and contextual information persist. Some aspects of a procedure are forced into the open, code numbers are given to the various types of transactions, and to the expected catagories of errors for instance, but it is still not possible to define the exact use of the various elements of information finally appearing on the printouts.

Whether you are faced with computerization or not, if you look closely at your own library procedures, you could well be surprised and fascinated by the methods used, and the reactions of your staff. I have shocked a few librarians myself at the end of my visits when they asked how many forms I had collected in their libraries, and many a boss in industry has been amazed to find how differently the working methods have evolved from the general idea of things he held, or the original guidelines he laid down. That tendency for forms to proliferate and files to become sacred repositories needs to be curbed.

The concept of organization slack, and its opposite, the existence of pressure, has increasing relevance to many libraries today. Basically, when an organization has been reasonably successful in performing according to its expectations, pressure is relaxed and day-to-day operations proceed peacefully and unquestioned. However, when the organization is less successful, or has higher expectations thrust on it, cost-consciousness and internal pressures to increase performance build up and ways of improving the situation are eagerly sought.

Knowing what is to be done can be used to encourage flexibility and adaptation in these circumstances, not used as a rigid framework to prevent change. It can also provide a basis for control: if this is what has to be done, and we processed four hundred books last month, why have we done two hundred or five-hundred and fifty this month?

If you decide to analyse your own system, there are several possible ways of going about it. You can try to tidy up the existing system, or more basically perhaps, you can start with the grid of procedures and activities developed during this project, and consciously question five-hundred and forty possible decisions about the use of forms. That is:

what information is necessary?
where does it come from?
how should it be used?
by whom?
and when?

at each activity stage of each procedure. The last can be partly answered by the built-in time sequence of the procedures. You cannot process a book before you get it, and most libraries do not like a book being used before it has been processed. If you use this basic sequence of events, and agree that the fewer forms the better, the primary question at each decision point becomes: Is there a form already available from a previous activity that can be used?

Another step is to look at the network of procedures and identify the major file points. There are eighteen possible 'official' files, at the Record activity of each procedure. Of these eighteen, some must be permanent records, the catalogue for instance, and the accession register if you decide you need it. Having identified these, this gives you the minimum number of pieces of paper you can work with. The other files can be as temporary as possible, releasing the form to other stages of activity, and other files.

The information content problem can be tackled by following the basic principle of minimum transcription of information, that is, the minimum necessary for the form to function at each of the stages of each of the procedures you intend to use it for. A good way of doing this is to get together all the people who will have to use the form, especially the typist. Once the information content is decided, there are a number of books on office management, which include chapters on the basic principles of forms design.

Once you have diagrams of the activities, quantify where you can for control. One librarian pointed out rather plaintively that his box should be bigger than the rest because it took longer. If you can get some notional times (self-timing by your staff perhaps) you know how much effort you need to clear the work in hand, and can plan accordingly. Diagrams of a new method can be contrasted with the existing one; a crude but effective demonstration that it should be better is that less activities total less time, so the new method should show fewer boxes. The diagrams are a useful way of documenting the decisions made in designing your procedures and can be used as training guides for new staff, or basic information to gauge the effect of any further changes you might want to make. If computerization is suggested, you have a basis for discussion with computer personnel, presented in a language they understand, and if the O & M men of your parent organization descend on you, a ready-made description of your library's activities to keep them occupied.

The work so far has shown how forms can link the different parts of a library system, and has emphasized the difficulties of describing in consistent detail the routine tasks involved. I hope to experiment with the information collected, to find out how to interrelate the procedures in more effective ways, how to make more of the implicit decisions explicit, and to investigate the information needed to make better decisions. I do not think there is one standard answer, but I do believe that librarians need to be aware of the existence and the costs of their local variations, and of some of the other ways of coping with similar procedures. In looking at present practice, I have tried to promote a questioning attitude toward library procedures, and I hope the methods of analysis developed during this project will be useful to you as librarians studying your own systems, and looking for your own individual answers.

NOTE

The results so far of Pauline Thomas's research have been reported in three of the Aslib Occasional Publications Series:

No. 3, with Harry East. *Use of bibliographic records in libraries.* £1.30; £1.05 to members (SBN 85142 040 0).
No. 4. *Procedural model for the use of bibliographic records in libraries.* £1.75 (SBN 85142 025 7).
No. 8. *Task analysis of library operations.* £2.00 (SBN 85142 034 6).

Analysing industrial information service costs: a simple check list

Alan Armstrong

Information Officer, Kellogg International
Corporation

MANY of us younger and less experienced information officers flounder hopelessly (some in a delightful feminine helplessness) when asked to present an analysis of the cost of the information service we run.

The panic stems from three things: first, not knowing when asked; secondly, only having a short time to find the answers; thirdly, not knowing how to start.

An alternative to this panic is to precede any involuntary inquisition by a self-imposed costing exercise which can be done at leisure, regularly reviewed and revised at leisure, and pigeon-holed until required for presentation to the boss.

The costing exercise can be superficial to include salaries, stationery, books and journals or it can be done thoroughly. When it is called for and you have to present it, there can be a keen smell of corporate surgery in the air and it may be as well to have made a meticulously thorough analysis. Corporate surgeons lay every possible cost at your door. If you know what the costs are, you can defend them.

Whether cost analysis is done leisurely, or in haste, a simple checklist helps. For this text the author assumes you have leisure.

Cost analysis cannot be done alone. We have to consult and use the skills and goodwill of accountants and personnel officers. They will be helpful as long as we explain what we are doing. Never try to cost your operation by yourself. It must be done within the ground rules set by the company accountants. For example, find out whether the company charges each department for its postal costs. If so, add them; if not, note in your analysis that postal costs are not set against your operation. On almost every costing issue, you must talk to others.

Salaries

First of all add up the annual salaries of all your staff. If your organization pays overtime, ask the personnel or payroll section to give you the annual overtime payments for the last twelve months. Beware of exceptional workloads which may have made overtime payments unusually heavy.

Salary burden

These are the additional costs incurred by the company when employing library staff, or any staff.

How you actually get to your departmental figures is a matter which only you and your other office colleagues will ever understand. Salary burden has different ingredients in different companies, so any of the following items might be included. All are costs and none can be ignored.

National health insurance
How much does the organization pay per year in NHI stamps for the staff?

Pension
What amount does the company pay towards pensions and life insurance. If the personnel department are reluctant to give precise figures, ask for the information as a percentage of each person's salary. It could be as much as 6 per cent of annual salary.

Training board levy
Again this may be easier to obtain as a salary percentage, e.g. 2½ per cent of annual salary.

Holidays and sickness
The company pays you for your national and annual holidays. It also pays you during sickness. The burden lies not in the salary payment (already accounted for in preceding paragraph on salaries) but in the cost to the company of up to thirty or more days per person per year as holiday, and sick days which must be written off by the employer as wholly non-productive. This could be 8–9 per cent of each person's salary. In a factory this could more easily be measured as loss of output.

Paid absence
If your Aunt Maud died, and you took time off, the same principle applies as in the preceding paragraph.

Recruitment costs
Did you recruit staff during the year? What were the costs of recruiting—include advertisements, etc?

Temporary staff
What was the cost of temporary staff for your department?

Canteen subsidy, or luncheon vouchers
One usually gets either one or the other. Both cost the employer money. What is your share of the cost?

Group insurance
In addition to life insurance and pension fund, there could be widows benefits, salary continuance, group travel accident, etc.

Some or all of these items could be charged to you in your organization. There will be more, peculiar to your own situation.

Ask Personnel to help you to determine the costs of each. If Personnel are vague and non-committal, ask for annual salary burden items to be costed as a percentage of each employee's annual salary. It could be about 25–26 per cent of annual salary.

Occupancy costs

Rent

How many square feet does the information service cover? Multiply the number of square feet by the rent that the organization pays per square foot. Outside London it could be £2 per square foot, inside London it could be £7 or more per square foot. If your company owns its building, maybe nobody pays anything. I doubt it—check with financial people, bearing in mind that usable space rate is higher than just plain square footage. Rents in the City of London have risen very sharply during the past few years and have now reached figures of between £10 and £12 per square foot. On average each person employed occupies a little over 100 square feet of working space, so that in the City the cost is more than £1,000 a year per head of staff. The equivalent cost in the country, for example in Knutsford, Cheshire, is no more than £150 a year.

Rates

Divide the total rates charge of your building by that percentage portion you and the library occupy and find how much in rates the library pays.

Heating

Ask for an estimated departmental heating charge. You may find this information a little difficult to find, but if you say why you want to know, you should get a sensible answer. If in doubt, estimate it using your knowledge of domestic charges.

Lighting

Use the same procedure as for heating; estimate from your annual home bills if you have to—but ask for help first.

Cleaning

The office is cleaned each evening—ask the administrators for your departmental charge. If necessary, take the total company annual bill and divide it by the number of employees to find the cost per employee.

Dilapidations

Many companies and organizations subdivide annual dilapidations (painting repairs and maintenance of fabric) to departments. Most do not. Find out whether your employer does.

Departmental costs

Stationery

Ask the administrators the cost of what you ordered over the previous twelve months. They delight in knowing this or working it out for you.

Postage
Like the telephone, it could be apportioning of letter charges by department plus recorded parcel charges. Again it will be more than you expect.

Other staff
This is one really difficult to assess. The company messengers, commissionaires, telephonists and other non-productive staff, such as the legal and financial departments, are there to assist and support your function and service. As such, their costs may be apportioned to those who use them, you included. It's tempting to disclaim this item, but when you are in full operation, can you deny using telephonists, telex operators, messengers, company postmen, and so on? Be prepared to find that you are being charged for the use of this support staff. (This is why you should always encourage the minimum number of personnel officers possible.)

These can be described as overheads transferred into your budget, for which you are accountable. One example is printing. Do you pay for photocopies? Does the charge apportion operator's salary and occupancy costs or is this charged separately, perhaps annually, on a department usage system?

Telex
If you have telex, are you charged in any way for costs of sending your telexes? If so how much? Who pays the equipment rental?

Furniture
Is your furniture rented or purchased? What are the rental charges—for instance, on electric typewriters or calculating machines? If purchased—what has been purchased in the last twelve months and what previously, if you depreciate your costing over some years? Check with the financial people on how they apportion furniture costs to you.

Telephone
This cost will usually be a mixture of recorded long distance calls plus a random division by department of local and self-dialled STD calls. The cost will be higher than you think.

Books, journals
Some charges must be absorbed by the information department for books, directories and journals. Follow precedent in determining those purchases which are yours and those which are paid for by other budgets.

Travel
What have been the staff travelling costs for the period?

Consultants
Did you use consultants, e.g. Aslib, during the year—what was the cost?

Hotel and other expenses
What expenses have been incurred in hotels, restaurants?

Corporate subscriptions
If your company is a member of Aslib, add this corporate charge here. You can try to offset this cost to user departments on the grounds that it is useful to them, but this invites reciprocation; for example, you may be invited to help pay the fee to the Personnel Officers Association—as if it helped you in some way. It would be better to absorb the Aslib subscription charge as your own, if possible. Add other corporate subscriptions here too, e.g. British Standards Institution, but only if it really is your departmental subscription.

Professional fees
Some organizations pay employees' professional institute fees: Is your company paying yours? If so, how much per annum for your staff?

Training expenses
Internal or external training courses for staff can be costly. How much did your department spend during the year?

Conferences
We all like to go to one or two a year and only churlish organizations say no. How many have you been to at £50 per day? This usually can be tied in with hotel, restaurant and travelling expenses.

Others
There are many—space does not allow a longer list. Each of us can add items peculiar to our organizations. If you feel like it, add £3 per member of your staff for the annual Christmas party—it has to be paid for!

In summary, there are obviously more charges and costs to be considered than salary alone. Some items in the checklist may plainly not apply in your organization. However, it is sensible to eliminate them. Adding up the costs can be more than a little frightening. Real operating costs can be as much as 200–300 per cent higher than total annual salaries. If this is so, then the earlier and more carefully the unit is costed by the librarian, the sooner can self-analysis of cost-benefit comparisons get underway.

For this is always the supplementary question after submitting the total cost: 'What measurable or tangible benefits to the organization are derived from this annual expenditure?'

If the annual expenditure is £20,000, we all need to have a good list of benefits ready when asked: especially if the company surgeon is already leading you to the operating theatre.

CURRENT AWARENESS LIST

Recent additions to the Aslib library catalogue are broken down into twelve broad groups, whose coverage is indicated below. These groups are not mutually exclusive but it is hoped that users will find them helpful in scanning for new items of interest.

User Studies
Analyses of information-seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory.

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject Organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies; reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; leading and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies, directories.

JANET WALKLEY
Librarian

CURRENT AWARENESS LIST

Items are available in the Aslib Library and may be borrowed unless marked to indicate reference copies.*

User Studies

HALL, ANGELA M.
User preference in printed indexes.
London: INSPEC, July 1972.
iv. (OSTI Report 5131.)

HALL, ANGELA M.
Case studies of the use of subject indexes.
London: INSPEC, July 1972.
15p. (OSTI Report 5132.)

SZENTIRMAI, LASZLO
Az informacios forrasok szerepe a biologusok szakmaitajekozodlasaban.
Tudomanyos es Muszaki Tajekoztatas, vol.19, no.6, June 1972, p.401–18.
Hungarian biologist' sources of information, and the use made of them.

KNEITSCHEL, FRANZ
Der Informationsbedarf aus gesellschaftlicher Sicht und einige Tendenzen seiner Entwicklung.
Informatik, vol.19, no.3, 1972, p.9–15.
The information needs of socialist countries in the field of science and technology.

Communication and Knowledge

REES, ALAN M.
Interface of technical libraries with other information systems: a synthesis.
Washington, D.C.: United States Department of the Army. Office of the Chief of Engineers, March 1971.
[iii], 132p. (TISA project report no. 35.)
Reprinted, with special introduction, in Information: Part 2: Reports, Bibliographies, vol.1, no.1 January–February 1972.

LANGRISH J. *and others*
Wealth from knowledge: studies of innovation in industry, by J. Langrish, M. Gibbons, W. G. Evans, and F. R. Jevons.
London: Macmillan, 1972.
333-12007-8.
xiii, 477p.

THE PAPER pushing fallacy.
Management Today, September 1972, p.109–112.
Assessment of the relevance of written communications in the light of new technology.

SAMUELSON, K.
A FID/TM tevékenysége: rendszerelmélet, rendszer-módszertan kibernetika és tsjékoztatası hálózatòk.
Tudonıdnyos, es Müszaki Tajékoztatds, vol.19, no.7, July 1972, p.507–19.
The principles behind the work of the FID/TM Committee in the fields of systems study, cybernetics and information networks.

Information Processing Systems

DEFENSE DOCUMENTATION CENTER
Information sciences: information centers and special libraries: volume II: a DDC bibliography: September 1959–February 1969.
Alexandria (Va.): the Center, March 1972.
159p. (AD-739 610.)

DEFENSE DOCUMENTATION CENTER
Information sciences: information processing systems and techniques: volume III: a DDC bibliography: April 1958–April 1971.
Alexandria (Va.): the Center, March 1972.
[303]p. (AD 739 620.)

LEBEDEV, G. A.
Metodi otsenki i vozmozhnosti sovershenstvovaniya otdel'nikh elementov sistem informatsionnogo obsluzhivaniya.
Nauchno-tekhnicheskaya Informatsiya, Seriya 1, no. 4, 1972, p. 9–14.
Methods of evaluating information systems, and possible improvements for individual components.

NOVIKOVA, T. YA.
Modelirovanie protsessa sbora i obrabotki materialov v otraslevoĭ informatsionnoĭ systeme.
Nauchno-tekhnicheskaya Informatsiya, Seriya 1, no.4, 1972, p.15–20.
Modelling the gathering and processing stages of a geological information system.

KARELIN, B. V. *and* BATUEV, S. N.
Issledovanie nositeleĭ informatsii 'Uniterm-Kart'.
Nauchno-tekhnicheskaya Informatsiya, Seriya 1, no.5, 1972, p.18–20.
A new version of the uniterm card which reduces matching time and has a greater capacity.

RUDORF, DIETER *and others*
Einsatz einer teilautomatisierten sichtlochkartei.
Informatik, vol.19, no.3, 1972, p.33–9.

A partially-automated optical coincidence system for non-ferrous metal literature at the Forschungsinstitut für NE-Metalle in Freiberg.

LEŠICKÁ, K. *and* KOHNOVA, Z.
Strojové rešerše z fondu CA—Condensates.
Československá Informatika, vol.14, no.6, 1972, p.24–30.
Retrieval from *Chemical Abstracts—Condensates* tapes.

Language and Indexing

STOLK, H. A.
Glossary of documentation terms: prepared under the auspices of the Technical Information Panel of AGARD, an agency of NATO.
New York: Science Associates/International, [1972?]
[13]p.

NÁLEVKOVÁ, MARTA
Terminologie informatiky.
Československá Informatika, vol.14, no.6, 1972, p.9–15.
Work on establishing and standardizing terminology in the field of informatics

NATIONAL LIBRARY OF MEDICINE (UNITED STATES)
Medical subject headings: alphabetical list.
Bethesda (Md.): U.S. Department of Health, Education and Welfare, April 1972.
329p. (PB 207 180.)

NATIONAL LIBRARY OF MEDICINE (UNITED STATES)
Medical subject heading—tree structures: 1972.
Bethesda (Md.): the Library, 1972.
311p. (PB 207 176.)

*ENGINEERING INDEX, INC.
Engineering Index Thesaurus.
New York: CCM Information Corporation, 1972.
8409-0011-2
xiii, 402p.

FOOD AND AGRICULTURE ORGANIZATION
Documentation Centre
FAO indexing terms: permuted alphabetical listing.
The Organization, February 1972.
[459]p.
8 *microfiches*

*AITCHISON, JEAN *and* GILCHRIST, ALAN
Thesaurus construction: a practical manual.
London: Aslib, 1972.
85142-042-7
iii, 95p.

MOSKOVICH, V. A.
Distributivno-statisticheskiĭ metod postroegeniya tezaurusov: sovremennoe i perspektivi: Ch.2.
Nauchno-technicheskaya Informatsiya, Seriya 2, no.4, 1972, p.15–24.
The statistical distribution method of thesaurus construction.

WERDER, HORST
Rechnergestutzte Thesauruserarbeitung undpflege.
Informatik, vol.19, no.3, 1972, p.25–32.
The computer-aided construction and maintenance of a thesaurus.

LĂZARESCU, GEORGETA
Consideratii privind elaborarea si utilizarea unui tezaur pentru sistemele de difuzare selective a informatiilor.
Studii si Cercetări de Documentare, vol.14, no.2, June 1972, p.127–33.
The effectiveness of an automatically produced thesaurus for SDI, exemplified by Chemical Abstracts Service profiles and the CAS Search Guide.

VOĬSKUNSKIĬ, V. G. *and* FRANTS, V. I.
Eshelonirovanie v deskriptornikh IPS.
Nauchno-tekhnicheskaya Informatsiya, Seriya 2, no.4, 1972, p.34–5.
The ranking of descriptors in information retrieval systems.

CHAREN, THELMA
MEDLARS indexing manual.
Bethesda(Md.): National Library of Medicine, 1972.
520p. (PB 207 181.)

PAVLOVICH, I. A.
O nekotorikh psikhologicheskikh aspektakh indeksirovaniya (na primere UDK).
Nauchno-tekhnicheskaya Informatsiya, Seriya 2, no.4, 1972, p.11–14.
The psychological factors affecting indexing quality, illustrated by UDC.

CAMERON, JAMES SLAGLE
Automatic document pseudoclassification and retrieval by word frequency techniques.
Columbus (Ohio): Ohio State University. Computer and Information Science Research Center, March 1972.
vii, 165p. (OSU-CISRC-TR-72-4.)

Classification and Cataloguing

MAXWELL, D. C.
Use of an organic compound notation or a compound classification as an aid to information retrieval for specialised information centres.
Aldermaston: AWRE, January 1972.
85518017-X

11p. (AWRE 02/72.)

BRITISH STANDARDS INSTITUTION
Universal decimal classification: English full edition: 4th international edition: Index to the selection of common auxiliaries of place for use with UDC 9.
London: the Institution, June 1972.
0-580-07064-6
12p. (BS 1000[9]: 1972; FID Publication No. 179.)

WIJN, J. H. DE
A FID/CCC és az ETO revíziójának és kiadásának rendje.
Tudományos és Műszaki Tájékoztatás, vol.19, no.7, July 1972, p.493–506.
The role of FID's Central Classification Committee in the revision of UDC.

INIS
Authority list for corporate entries.
Vienna: International Atomic Energy Agency, 1972.
99p. (IAEA-INIS-6 (Rev. 4.))

INIS
Descriptive cataloguing rules.
Vienna: International Atomic Energy Authority, 1972.
96p. (IAEA-INIS-1 (Rev. 2.))

Mechanization

ORTIZ, J. R. O. *and others*
Project briefs of automated activities in South America.
1972.
72p. (LARC reports vol. 5, issue 1.)

NEGOITA, C. V.
Linear and nonlinear information retrieval systems.
Didcot (Berks): Science Research Council. Atlas Computer Laboratory, August 1972.

GALLIVAN, B. *and others*
Computer listing of a reserve collection, by B. Gallivan, R. N. Bamber and M. K. Buckland.
Lancaster: Lancaster University Library, 1972.
iii[68]p. (University of Lancaster Occasional Papers, no. 6.)

MARC DEVELOPMENT OFFICE
Information on the MARC system, 2nd ed.
Washington: Library of Congress, 1972.
31p., bibliog.

ROWLETT, RUSSELL *and* TATE, FRED A.
A computer-based system for handling chemical nomenclature and structural representations.
Journal of Chemical Documentation, vol. 12, no.2, May 1972, p.125–8.

GÜLDNER, RUDOLF *and* LÖHR, HAROLD
Stand der EDV-Anwendung in der Zentralen Informationsstelle des VEB kombinat Schaltelektronik.
Informatik, vol.19, no.2, 1972, p.35–7.
The introduction of EDP to the information centre of the East German state electronics concern.

QUEEN'S UNIVERSITY (BELFAST). COMPUTER LABORATORY AND DEPARTMENT OF COMPUTER SCIENCE
Queen's University on-line bibliographic information retrieval and dissemination system: project QUOBIRD annual activity report for the period ending on 31st December, 1971.
Belfast, the University, January 1972.
lv. (OSTI report no. 5125.)

O'SULLIVAN, D. F. *and* HALL, F. J.
QUIS: Queen's University Information Systems: TELEX: Short feasibility study on using the Post Office Telex Network for on-line computer information retrieval: special report SR3.
Belfast: Queen's University Computer Laboratory, January 1972.
[50]p. (OSTI Report no. 5126.)

QUEEN'S UNIVERSITY (BELFAST). COMPUTER LABORATORY AND DEPARTMENT OF COMPUTER SCIENCE
QUIS: Queen's University Information Systems data bank on atomic and molecular physics: annual activity report for the period ending on 31st December, 1971.
Belfast: the University, January 1972.
iv, [71]p. (OSTI Report no. 5127.)

MENDELOVICI, MARIUS *and others*
Sistem automatizat de informare documentara echipat cu un calculator electronic de birou.
Studii si Cercetări de Documentare, vol.14, no.1, March 1972, p.27–40.
An automated information system in the Romanian Centrului de cercetari pentru problemele tineretului (Research Centre for Youth Problems).

Subject Organization

CALDERHEAD, PATRICIA
Libraries for professional practice.
London: Architectural Press, 1972.
0 85139-565-1
127p.

NORTHCOTT, JEAN
Reading problems in an industrial information center.
Journal of Chemical Documentation, vol.12,

no.2, May 1972, p.84–6.
Varieties of external information services, and how industrial information centres can use them and combine them with internal services.

WILLIAMS, S. *and* POLLER, R. M.
Subject specialists at the University of South Africa.
South Africa Libraries, vol.39, no.4, January 1972, p.264–71.

SHEEHY, EUGENE P. *comp*
Guide to reference books: 8th ed.: 3rd suppl.: 1969–1970.
Chicago: American Library Association, 1972.
ix, 190p.

Reprography

BRITISH STANDARDS INSTITUTION
Microfilm in the office: an introduction to microcopying.
London: the Institution, 1972.
11p. (PB 6465: 1972.)

WIRTH, EBERHARD
Probleme beim Einsatz der Mikrofilmtechnik in Informationseinrichtungen Wissenschaft und Technik.
Informatik, vol.19, no.2, 1972, p.38–43.
Introducing microform technology in information centres.

LEPŠÍK, VĚKOSLAV
Nově směry v reprografii pro informační systémy.
Československá Informatika, vol.14, no.6, 1972, p.16–23.
New uses for microforms in information systems.

Printing and Publishing

ROBB, DOUGLAS
Scientific publishing and the law.
New Scientist, vol.55, no.809, 17th August 1972, p.335–6.
The implications for scientific publishing of the 'Drummond–Jackson v. B.M.A. and others' libel case.

TIMOSHIN, YU. V. *and* SEMIKHODSKII, G. E.
Osobennosti sistemi tsitirovaniya v literature po geofizicheskoĭ razvedochnoĭ tekhnike.
Nauchno-tekhnicheskaya Informatsiya, Seriya, no.4, 1972, p.24–6.
Citation characteristics of Russian geophysical papers.

Administration and Management

HICKEY, DORALYN J.
Problems in organizing library collections.
London: R. R. Bowker, 1972.
0-8352-0539-8
xx, 206p.

COLLEY, D. I.
Information and management.
Library Association Record, vol.74, no.9, September 1972, p.159–61.
Problems involved in the provision of information to management to assist in effective decision-making.

GOL'DGAMER, G. I.
Nekotorie voprosi organizatsii i upravleniya deyatel'nost-yu informatisionnikh sluzhb NII, KB i predpriyatiĭ.
Nauchno-tekhnicheskaya Informatsiya, Seriya 1, no.5, 1972, p.3–8.
The organization and management of information centres for R & D institutions and industrial plants.

GRAF, H.
Rationalisierung mit Hilfe von Programmablaufplanen.
Informatik, vol.19, no.3, 1972, p.44–9.
Rationalizing information work by using flow-charting techniques.

BINYON, MICHAEL
Survey reveals wide disparities in spending on libraries.
Times Higher Education Supplement, no.45, 18th August 1972, p.5.
Gives detailed tables of expenditure on books and periodicals in all U.K. university libraries.

LIBRARIES AND VALUE ADDED TAX
Library Association Record, vol.74, no.9, September 1972, p.161.
A summary of the ways in which VAT will affect libraries as from April 1973.

LIGHT reading
Building, vol.223, no.6742, 11th August 1972, p.47.
Describes plans for the new public library in Wellingborough, Northants.

HOEY, P. O'N
Systematic utilization of human resources as an integral part of information science work . . . 5th Biennial Conference [of the] Institute of Information Scientists, Manchester, April 12th.
London: J. Lyons & Co. Ltd, Group Scientific Information Service, 1972.
16p, bibliog.

MOREIRA, ALZIRA TEIXEIRA LEITE
Conservacao seleccao e eliminacao de documentos nos arquivos administrativos.
Cadernos de Biblioteconomia. Arquivistica e

Documentacao, vol.9, no.1, January 1972, p.21–7.
Preservation, selection and weeding of documents in administrative archives.

LAKHANPAL, S. K.
Library binding manual.
Saskatoon, Saskatchewan University. Murray Memorial Library. Serials Department, 1972.
ii, 47p.

Library Systems

WYSOCKI, A.
As UNISIST program megvalósitàsi tervei.
Tudományos és Muszaki Tájékoztatás, vol.19, no.7, July 1972, p.536–47.
Plans for implementing the UNISIST programme.

SKRIPKIN, V. A. *and* SUMAROKOV, L. N.
Problemy vymeny vedeckotechnickych informaci mezi clenskymi zememi RVHP.
Ceskoslovenská Informatika, vol.14, no.6, 1972, p.1–8.
Problems in establishing an international information system in the Communist bloc countries.

BROWN, JACK E.
The Canadian national scientific and technical information (STI) system: a progress report: 1972 Miles Conrad memorial lecture.
Philadelphia (Pa.): National Federation of Science Abstracting and Indexing Services, May 1972.
26p. (NFSAIS report no. 4.)

DUCOTE, RICHARD L.
Two decisive decades: spiralling patterns in college libraries.
American Libraries, vol.3, no.7, July/August 1972, p.733–4.
Developments in academic libraries in the U.S. 1951–71.

Professional Activity

CHAPLIN, A. H.
The organization of the library profession: final report of two plenary sessions of the IFLA General Council, Liverpool, 1971.
Unesco Bulletin for Libraries, vol.26, no.4, July–August 1972, p.178–83.
The achievements of library associations throughout the world, and problems still requiring attention.

ENRIGHT, B. J.
New media and the library education.
London: Bingley, 1972.
0-85157-139-5.
162p.

SCHICK, FRANK L. *and* WEINTRAUB, D. KATHRYN
North American library education: directory and statistics 1969–1971.
Chicago: American Library Association, June 1972.
0-8389-3109-X.
vii, 87p.

*FINER, RUTH
A guide to selected computer-based information services.
London: Aslib, 1972.
85142-045-1.
ii, 115p.

BUSSE, GISELA VON *and* ERNESTUS, HORST
Libraries in the Federal Republic of Germany: revised and enlarged English edition.
Wiesbaden: London: Otto Harrassowitz; Library Association, 1972.
0-85365-055-1.
308p.

MEMBERS' ADVERTISEMENTS

Acceptance of advertisements for publication in Proceedings *does not imply Aslib support for or endorsement of the goods or services advertised.*

Members' advertisement rates: first 15 words (minimum), 50p; 3p for each additional word. 10p if box number required. (No agency discount.) A separate section of these columns is available to non-members at £3 per s.c.i.

Translations services

MEDICAL AND HIGHLY SPECIALIZED SCIENTIFIC TRANSLATIONS. S.M. Bonnekamp, FIL, Member of the Translators' Guild (Med. Science & Lit.), 47 Firs Close, Muswell Hill, London, N10. Tel. 01-883 3962 during office hours. After office hours an automatic telephone answering machine will record messages.

BUILDING AND CIVIL ENGINEERING TRANSLATIONS from Russian and German into English. G. L. Cairns, MIL, 19 Kingsley Place, London N6. Tel. 01-340 8990.

TECHNICAL SWEDISH, DANISH, NORWEGIAN translated by J. T. Craddock, B COM, FIL, Ekard, Ray Park Avenue, Maidenhead, Berks. Maidenhead 24931.

JAPANESE/ENGLISH RUSSIAN/ENGLISH translations. Chemistry, medicine, biology, zoology. D. A. Fraser BA, MIL, 22 Gresley Road, London N19 3JZ. Tel: 01-272 5564.

WILFRED E. GOODAY, ARSM, DIC, C.ENG, MIMM, FIL. Member of Translators' Guild, Romanian and French. 161 Rivermead Court, London SW6, RENown 1912.

SCIENTIFIC TRANSLATIONS FROM JAPANESE, CHINESE, RUSSIAN, CZECH and East and West European languages into English and/or German. A. K. Henn, B.SC, 'Glenside', Lower Leigh Rd., Pontnewynydd, Pontypool, Mon. Tel: Pontypool 3689 (after 6 p.m.).

BILINGUAL (JAPANESE/ENGLISH), ESTABLISHED translator of an extensive range of subjects in science and technology. Owns a bilingual reference library and typewriters for symbols and Greek, Western European and Japanese languages. David Jackson, FIL, FCS, 71 Livingstone Road, Gillingham, Kent. Telephone: 0634 52994.

MEDICAL, PHARMACEUTICAL, BIOLOGICAL translations from French, Romanian and Portuguese into English and from English into French and Romanian. Dr J. Jacobson, 94 Temple Fortune Lane, NW11. 01-455 1010.

TECHNICAL TRANSLATIONS from Russian, German and Polish into English. B. Klipstein, BSC(HONS), 1 Glenview Grove, Shipley, Yorkshire. Tel. Shipley 58215.

TECHNICAL AND COMMERCIAL translations from English into Russian. Mrs O. Linsley, 31 Parke Road, Barnes, London SW13. Tel. 01-748 8822.

TECHNICAL TRANSLATIONS from Japanese into English. R. A. Scutt, BA, 48 Somerset Avenue, West Wimbledon, London SW20. Tel. WIMbledon 1713 (01-946 1713).

TECHNICAL OR COMMERCIAL translations into/from English, German, Dutch and French. A. M. H. Speller, FIL, NGV, 6 Lakeside, West Ealing, London, W13 8HN. Tel. 01-998 1045.

AUTHORITATIVE TECHNICAL TRANSLATIONS. Spanish, French, Italian, German, Portuguese, camera copy or printed. E. W. Sykes, FIL, 39 West Close, Wembley, Middlesex, HA9 9PJ. Tel. 01-904 4273.

For sale

ELECTRONICS 1938–1958, partly bound, lacking 12 issues, offered free to someone, who will arrange collection; also *Solid State Technology*, unbound 1966 to date. Apply: Librarian, Rediffusion Engineering Ltd, 187 Coombe Lane West, Kingston-on-Thames, Surrey.

Advisory services

IRAS: A NEW ADVISORY SERVICE. As much or as little advice and assistance as you need—anything from a half-day's talk to a six-months' assignment. Miss Helen Townley, I.R. Advisory Services, 117 Wickham Chase, West Wickham, Kent, BR4 0BQ. 01-777 7560.

INDEXERS/ABSTRACTORS, FREELANCE/PART-TIME. I.R. Advisory Services has list of over 40 experienced people in wide range of disciplines, on whom you may draw in emergency or for free-lancing. 117 Wickham Chase, West Wickham, BR4 0BQ.

NON-MEMBER'S ADVERTISEMENT

YOUR COMPANY HISTORY—whether book or booklet, commission a full-time professional industrial historian to research and write it. Hugh Barty-King, BA(CANTAB), Holgate House, Ticehurst, Wadhurst, Sussex; Tel. Ticehurst (05807) 557.

Information wanted

MICRO-TWIN microfilm machine. Anyone with experience of or information on this machine is requested to contact advertiser. Maker's literature, e.g. handbook, would be of interest. Please contact T.I. Department of Technical Information, Rocky Lane, Aston, Birmingham B6 5RH.

INFORMATION ASSISTANT IN PATENTS

An assistant is required in the Information Section of the Group Patents Department, based in St. Helens The department provides a service in industrial property matters to the whole of the Pilkington Group in the U K. and overseas The Group's interests are mainly in the manufacturing and processing of glass

Applicants should have had at least 1–2 years' experience of working in an industrial information department preferably in patent information work A technical background, which must include some chemistry, is essential In the long term, the successful candidate could take over complete responsibility for this section.

Initial salary will be appropriate to qualifications, age and experience, and the conditions of service include a wide range of fringe benefits

Please write for an application form to

Miss A. F. Donald, Group Personnel Services,
Pilkington Brothers Limited, Prescot Road, St. Helens, Lancs.

PILKINGTON

CENTRAL ELECTRICITY RESEARCH LABORATORIES

Kelvin Avenue, Leatherhead, Surrey

require an

ASSISTANT LIBRARIAN

The Library is a growing one of approximately 20,000 volumes and currently subscribes to some 500 periodicals; it serves about 350 graduates together with associated support staff.

Applicants, who must be chartered librarians, should have had some experience in a technical library. The duties include the supervision of the work of assistants. A scientific education or a proficiency in languages would be an advantage.

The salary will be within the range £1827–£2178 per annum.

Write to Personnel Officer or telephone Leatherhead 74488 Ext. 363. Quote Ref. AP/268.

THE EUROPEAN SPACE RESEARCH ORGANISATION

ESRO

SCIENTIFIC INFORMATION

The SPACE DOCUMENTATION SERVICE which is to move to Frascati (near Rome) early in 1973 is looking for:

A DOCUMENTALIST-ENGINEER

(Post SDS(72)2) whose duties will include
- acquisition of the European aerospace literature
- cataloguing, abstracting and indexing this literature for entry into a large computer based system
- acquisition and data preparation of information for entry onto the ESRO electronic components databank.

Applicants should have a university degree or equivalent in electronics, electrical engineering or the physical sciences and experience in scientific information work. A knowledge of electronic component production processes and quality control and assurance procedures is desirable.

We offer: Comptetitive salaries with generous family and living allowances - international working conditions - good social security scheme - provident fund.
Write for detailed job description and curriculum vitae form to:
Assistant Director for Personnel, European Space Research Organisation 114 avenue Charles-de-Gaulle, 92200 Neuilly/Seine (France)

quoting référence SDS (72)2.

information scientist

pharmaceuticals

The Nicholas Research Institute require a young graduate, in chemistry or biological sciences, for a new appointment in the Technical Information Department with Research, Development and general company responsibilities.
The present systems and services, which are expanding, are fully in keeping with the requirements of a multinational pharmaceutical group.
The appointment would be of interest to graduates who are already in industry and who are looking for an opportunity to broaden their experience and take more responsibility.
A competitive salary will be paid and above average conditions of employment include a non-contributory pension and life assurance scheme.
Applications giving details of qualifications and experience to date should be sent to

K. S. Woodford, Personnel Manager

ASPRO-NICHOLAS LIMITED

225 Bath Road, Slough, Bucks

An essential for any organization involved in inspection

Quality Technology 73

Published by The Nondestructive Testing Centre, Harwell

A comprehensive directory listing, among other vital information

- ☐ Suppliers of equipment
- ☐ Organizations, national and international
- ☐ Technical data for quality technology
- ☐ Services available
- ☐ Standards and patents information

Available, price £5.00, from QUALTIS Manager,
The NDT Centre, AERE, Harwell, Didcot, Berks

Generating and printing indexes by computer

Lucille H. Campey

This is a survey of computer techniques used in producing printed subject indexes and of available, operational computer software based on these techniques with emphasis on UK systems. Details of machine requirements, component programs, input/output and availability conditions for over 100 operational index generation packages are reported, of which over 50 are UK systems and 20 are available from IBM.

Occasional Publication No 11 *SBN 85142 047 8* *£3.50*

A guide to selected computer-based information services

Compiled by Ruth Finer

This guide has been compiled as a result of a number of requests from Aslib members and to complement the information made available at the 1972 Aslib Annual Conference on External Information Services.

It provides detailed information for 48 computer-based information services, under standard headings such as Nature of Service, Cost, Data-base, and Methods of Assembling, Producing and Retrieving Information.

SBN 85142 045 1 *£2.40 net; £1.20 to members*

Aslib Publications

LIBRARY BINDING

This has been our trade since the last century, and in practising our craft we have given service to all types of libraries in many corners of the World.

We like to think we still bind books for libraries rather well, apart from our other activities as publishers and booksellers.

CEDRIC CHIVERS LTD

PORTWAY
BATH BA1 3NF

FIRST for carpets
Dodson Bull

UP TO 30% DISCOUNT
BRANDED CARPETS

● All makes available with full Manufacturers' Guarantees ● NO IMPERFECT GOODS SOLD ● Free delivery in U K. ● Expert fitting service available

£200,000 carpets on display

In our extensive London and provincial showrooms

Free brochure on request to Dept. ALB

DODSON BULL CARPET CO. LTD.

LONDON: 5 & 6 Old Bailey EC4M 7JD. Tel: 01-248 7971
BIRMINGHAM: 164 Edmund St B3 2HB.
Tel: (021) 236 5862
BOURNEMOUTH: 268 Old Christchurch Rd BH1 1PH.
Tel: 21248
BRIGHTON: 2-5 North Road BN1 1YA. Tel: 66482
BRISTOL: 2-3 Royal London House, Queen Charlotte St
BS1 4EX. Tel: 28857
LEEDS: 12 Great George St LS1 3DW. Tel: 41451
MANCHESTER: 55-61 Lever St M1 1DE.
Tel: (061) 236 3687/8/9
NEWCASTLE-upon-TYNE: 90-92 Pilgrim St NE1 6SG.
Tel: 20321/21428
WESTCLIFF-on-SEA: 495 London Rd SS0 9LG.
Tel: Southend 46569
9.00-5.30 Mon.-Fri. Sat 9.00-12.00 (Manchester 9.00-4.00)

British Technology Index

CURRENT SUBJECT GUIDE TO BRITISH TECHNICAL JOURNALS

FOR TRACING AND RECALL

of { specific
recent } information

In the Field of Applied Science, Engineering and Manufacturing Technology

Monthly Parts and Annual Volume

THE LIBRARY ASSOCIATION

7 Ridgmount St. Store St. London, WC1 7AE

(Phone: 01-636 7543)

A Classified Directory of Japanese Periodicals

ENGINEERING AND INDUSTRIAL CHEMISTRY

This guide to current Japanese periodical literature, in the fields of engineering and industrial chemistry, is based on the holdings of the National Reference Library of Science and Invention and the National Lending Library for Science and Technology, and upon the Japanese National Diet Library's *Directory of Japanese Periodicals*. The first part comprises a classified, annotated list giving such information as Japanese and English titles, language of articles, summaries and captions, date of first issues, and frequency. An alphabetical index of main and alternative titles follows.

The rapid increase in Japanese research and development over the last fifteen years has resulted in a corresponding increase in the publication of scientific and technical periodicals. By indicating what is available in particular subject areas, e.g. shipbuilding or plastics or pollution control, the directory aims to increase the general awareness of the existence and potential value of Japanese periodical literature, particularly where English language abstracting and indexing coverage is poor.

£3.50 (£3.00 to members)   160 pages; 1580 entries   SBN 85142 044 3

Aslib Publications

Published in England by Aslib, 3 Belgrave Square, London SW1X 8PL
Printed by Alden & Mowbray Ltd at the Alden Press, Oxford

Aslib Proceedings

CALCUTTA UNIVERSITY
CENTRAL LIBRARY

incorporating Aslib Information

**46th ASLIB ANNUAL CONFERENCE, SHEFFIELD,
September 1972**

Structure of information services D. V. ARNOLD 654

External sources of information: the kinds of services and facilities offered and criteria for evaluation B. C. VICKERY 664

The use of external data bases to extend current awareness services based on internal resources at AERE Harwell T. E. TERRY *and* P. J. JONES 672

The use of external data bases to extend current awareness services based on internal resources at AWRE Aldermaston P. D. FRIEND 678

External services in retrospective searching F. ROBINSON 686

ASLIB · 3 BELGRAVE SQUARE · LONDON SW1

Aslib Proc. vol. 24 no. 12 pp. 647-706 London, December 1972

A Classified Directory of Japanese Periodicals

ENGINEERING AND INDUSTRIAL CHEMISTRY

Compiled by P. C. R. Mason

This guide to current Japanese periodical literature, in the fields of engineering and industrial chemistry, is based on the holdings of the National Reference Library of Science and Invention and the National Lending Library for Science and Technology, and upon the Japanese National Diet Library's *Directory of Japanese Periodicals*. The first part comprises a classified, annotated list giving such information as Japanese and English titles, language of articles, summaries and captions, date of first issues, and frequency. An alphabetical index of main and alternative titles follows.

The rapid increase in Japanese research and development over the last fifteen years has resulted in a corresponding increase in the publication of scientific and technical periodicals. By indicating what is available in particular subject areas, e.g. shipbuilding or plastics or pollution control, the directory aims to increase the general awareness of the existence and potential value of Japanese periodical literature, particularly where English language abstracting and indexing coverage is poor.

£3.50 (£3.00 to members)   160 pages; 1580 entries   SBN 85142 044 3

Aslib Publications

CALCUTTA UNIVERSITY
CENTRAL LIBRARY.

Aslib Proceedings

incorporating Aslib Information

VOLUME 24 DECEMBER 1972 NUMBER 12

© 1972 **Aslib and contributors**

Aslib Proceedings *is published monthly and supplied free to members of Aslib. Subscription rates are £12 annually to non-members, or £4 to Aslib members requiring additional copies. Single copies £1, or 25p to members. From January 1973* Aslib Information *will be published as a separate monthly. Further information about Aslib's services and membership rates will be supplied on application to the Director, Aslib, 3 Belgrave Square, London SW1X 8PL. Tel. 01-235 5050. Telex 23667; answer-back, Aslib London.*

ASLIB CALENDAR 1973

January

WED.3.	Chemical Group wine and cheese party. Aslib. 5.30 p.m.
THU.4.	Economic and Business Information Group evening meeting and sherry party. Aslib. 5.30 p.m.
TUE.9.	Midlands Branch/Institute of Information Scientists joint meeting. Imperial Centre Hotel, Birmingham. 6.15 p.m.
WED.10.	Aslib evening meeting: 'Project SAPPHO and the role of information services', by Dr A. B. Robertson (Sussex University). Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1. 5.30 p.m.
WED.17–THU.18.	Midlands Branch Conference: 'Microfilms for industry—with exhibition.' Leicester.
THU.18.	Computer Information Group evening meeting: 'Classification schemes', by Alan Pritchard. Aslib. 5.30 p.m.
MON. 22	Social Services Group Annual General Meeting and lecture: 'The politics of librarianship', by M. B. Line (Librarian, National Central Library). Aslib. 4.30 p.m.
FRI.26.	Technical Translation Group Annual General Meeting and Lecture. Aslib. 3 p.m.

February

TUE.6.	Midlands Branch evening meeting: 'Standard times for information systems'. Imperial Centre Hotel, Birmingham. 6.15 p.m.
WED.14.	Aslib evening meeting: 'Computerisation of CAB', by Dr G. A. Somerfield. RINA, 10 Upper Belgrave Street, SW1. 5.30 p.m.

March

TUE.6	One-day symposium: 'Organization of modern newspaper libraries.' RINA, 10 Upper Belgrave Street, SW1.
WED.14.	Aslib/Publishers Association Technical & Scientific Group joint evening meeting. RINA, 10 Upper Belgrave Street, S1W. 5.30 p.m.
MON.19.	Computer Information Group Annual General Meeting and Lecture: 'Microforms', by C. E. Smith. Aslib. 5.30 p.m.
TUE.20.	Midlands Branch Annual General Meeting and social evening. Engineering and Building Centre, Birmingham. 7.30 p.m.

ASLIB INFORMATION

'Why some firms fail with industrial innovation—with reference to Project SAPPHO and the role of information services'

The speaker at the Aslib evening meeting to be held on 10th January 1973 will be Andrew Robertson, BSc(Econ), Reader in Management Studies, School of Management Studies, The Polytechnic of Central London, who is also a Senior Research Fellow at the Science Policy Research Unit, University of Sussex. Since 1968 Mr. Robertson has been specializing in Innovation Studies and took over Project SAPPHO in 1969, sponsored by the Science Research Council.

Project SAPPHO, which was carried out at the Science Policy Research Unit was an unusual if not unique attempt to probe the main causes of the high failure rates experienced by innovating organizations. The speaker will sketch the aims and methods of the project, which he led, and describe the results arrived at, with particular reference to the influence on success or failure of the organization's communication and information systems.

The meeting will be held at the Royal Institution of Naval Architects, 10 Upper Belgrave Street, London SW1, and will begin at 5.30 p.m. (tea 5.00 p.m.)

Aslib Book List

Following the decision recently announced to widen the scope of the *Aslib Book List*, the Editorial Board has been reconstituted. Two members, Mr G. Paterson and Mr S. C. Goddard, are retiring from the Board and we take this opportunity to record Aslib's appreciation of their work in fostering the development of the *Book List* over a number of years. The members of the Editorial Board are now L. J. Anthony, FLA (Chairman); C. D. M. Johnston, MA, CEng, National Reference Library of Science and Invention, Bayswater Division; J. Pemberton, BA, FLA, University of Warwick; D. Smith, ALA, AIInfSc, Wellcome Foundation Medical Information Centre; and F. R. Taylor, FLA, Manchester Technical Library.

Members are reminded that, as from January 1973, the *Book List* will no longer be distributed to members without charge and those who wish to continue to receive it should send their orders, if they have not already done so, as soon as possible to the Membership Secretary, Aslib, 3 Belgrave Square, London SW1X 8PL.

Check List of Social Science Serials (CLOSSS)

A machine readable data base of bibliographic information on social science and related serial publications has been compiled as part of the research programme of the OSTI-supported project at the University of Bath, Design of Information Systems in the Social Sciences (DISISS). At present, the data base contains information on some 5,000 titles both current and deceased, and is designed to assist in a bibliometric study of serial literature, investigating such parameters as size, growth, origin and distribution of the literature.

CLOSSS cannot claim to be comprehensive—a deliberate effort to make it so would not be justified within the context of DISISS—and the number of fields recorded for each title is limited, but even in its present form it is certainly much fuller than any other list of social science serials. It could be extended by the addition of further titles, particularly in foreign languages, and could perhaps form the basis of a comprehensive international list of serials relevant to the social sciences.

Printouts from the machine file will be available towards April 1973, and it will then be possible to assess its potential value as a bibliographical source by circulating it to various social science information users. The project team would welcome enquiries from potential users. Two working papers describing the CLOSSS project are available at £0.40 each. These are: *A machine readable data base of social science serials* (DISISS Working Paper no. 2); *A machine readable data base of social science serials: progress report 1971–72* (DISISS Working Paper no. 8); obtainable from Bath University Library. Correspondence should be addressed to J. M. Brittain (Senior Research Fellow), DISISS Research Project, University of Bath, Library, Claverton Down, Bath BA2 7AY.

ISSN and ISDS

For some time it has been recognized that there is a need for a standard unique code for the identification of serial publications which can be used wherever information identifying specific serials needs to be recorded or communicated. A draft standard for the creation of International Standard Serial Numbers (ISSN) was therefore drawn up by the International Organization for Standardization based on American proposals.

The structure of the ISSN has been largely agreed and will consist of eight digits presented in two groups of four separated by a hyphen (the last, eighth digit, being a check digit). The initials ISSN will precede each number, for example ISSN 1234-5679.

It is evident that to be effective the implementation of the code must be international but it must also be applied at the national level where serials originate and national collections are held.

At the international level the International Serials Data System (SDS)—which was set up on the recommendation of reports on two Unesco feasibility studies, and which will be funded jointly by the French Government and Unesco—will provide the international centre with which a network of national centres will co-operate. The assignment, control and promotion of ISSN will be undertaken by the international centre in Paris.

A number of countries, including the US, Germany, France and the Scandinavian countries, have so far offered to establish national centres for the assignment of ISSN to their national serials output, and in line with these developments the Organising Committee of the British Library has agreed that the British Library should operate the UK National Centre. Until the British Library is established the British National Bibliography has been asked to assume this responsibility in co-operation with the National Central Library.

NCET's memorandum on Public Lending Right

Following the comments submitted by Aslib to the Paymaster General on Public Lending Right and reproduced in our October issue, the National Council for Educational Technology have informed us that they have also submitted a memorandum to the Paymaster General which draws particular attention to the relation between PLR and the use of books and non-book materials for instructional purposes in educational establishments.

Among the observations made by NCET which should be of particular interest to members are these:

> '. . . we cannot accept that the provision of an educational resource, including a book or non-book protected by copyright, to a student in an educational establishment for the purpose of instruction can reasonably be regarded as public lending.'
>
> 'How, for example, can the showing of a film or television broadcast, or the playing of a gramophone record to a group of students in the course of instruction, be regarded as lending that film, broadcast, or record to each member of the group?
>
> 'We question, in any case, the principle of establishing a right to a reward for the provision of copyright materials for educational purposes additional to that arising from the normal sale or hire of the materials.'
>
> 'It appears to be the general opinion in these institutions [of education and training] that the money available for the purchase of books and non-book materials is inadequate to meet existing needs at current prices. The educational system is therefore certain to expect that the additional costs arising from the establishment of a lending right shall be met in full from public funds.'

Anyone requiring further information on the NCET's memorandum on Public Lending Right should contact Mr L. A. Gilbert, Assistant Director, National Council for Educational Technology, Great Portland Street, London W1N 5TB.

Biological information research

The Committee on Biological Information (COBI), of which Aslib is a member, has recently begun work on a project to 'further a rational approach to future development of the UK effort in the field of information services for workers in basic and applied biology, including medicine and agriculture'.

The project is supported by an OSTI grant and is headed by the Chairman of COBI, Professor John B. Jepson (Middlesex Hospital Medical School, London), who will be assisted by an Advisory Group drawn from COBI and elsewhere, and with Dr Richard H. Orr (1971 Senior Visiting Research Scientist at Aslib) as consultant.

Symposium for librarians and documentalists in agriculture, biology and related sciences

The International Association of Agricultural Librarians and Documentalists (IAALD) is organizing a European Regional Symposium at the International Agricultural Centre (IAC), Wageningen, from 14th to 18th May 1973.

The symposium will be entitled 'Progress and prospects in agricultural librarianship and documentation', and lectures will fall under three subjects: 1. Bibliographic aids in agriculture and biology; 2. Use of libraries and documentation services; 3. International collaboration.

Librarians and documentalists working in agriculture, biology, veterinary science, food science and technology, and related subjects are cordially invited. The fee will be 140 Dutch guilders for IAALD members and 175 Dutch guilders to non-members.

Further information is available from the secretary of the organizing committee, A. F. van Hattem, c/o University Library, Agricultural University, General Foulkesweg 1A, Wageningen, The Netherlands.

Medical library budgets

A survey of expenditure in various types of medical library has been compiled by the Research Sub-Committee of the Medical Section of the Library Association. Copies are available from: Miss P. Fear, Librarian, Royal Free Hospital, School of Medicine, 8 Hunter Street, London, WC1.

OSTI awards

Among the awards recently granted by the Office for Scientific and Technical Information for research projects in the field of library and information science are the following:

- A further grant of £10,750 over two years to Mr R. D. Whitley of the Manchester Business School for continuation of a feasibility study of information use and flow in university research laboratories, covering the fields of plant taxonomy, cancer research, entomology and statistics.
- A grant of £32,000 to Sheffield University Postgraduate School of Librarianship and Information Science for a full-scale study of the operational tasks upon which sound educational objectives in librarianship and information work may be based. The aims of this study are twofold: identification of principal tasks in library/information work, and identification of qualifications and qualities required for the effective performance of the tasks.
- A grant of £8,450 to Newcastle-upon-Tyne University for a two-year investigation of problems of stock control in an academic library, to be directed by Dr B. J. Enright, University Librarian Designate.
- To the Cranfield Institute of Technology, under the direction of Professor G. S. C. Wills, a grant of £14,000 over three years for a project aimed at

identifying the objectives of particular library services, to assess the cost of providing them, and to measure the benefit derived from them.

Further information about any one or more of these projects can be obtained from the respective directors of the projects at the institutions mentioned above.

BRIEF REVIEWS

ENCYCLOPEDIA OF ASSOCIATIONS. 7th edition. Volume 1, National Organizations of the United States; Volume 2, Geographic and Executive Index; Volume 3, New Associations and Projects. Detroit: Gale Research, 1972. Volume 1, 1452 pp. $38.50; Volume 2, 480 pp. $25.00. Volume 3, published quarterly from March 1972 to December 1973, $48.00.

More than 16,000 trade associations, professional societies, labor unions, patriotic societies and other types of groups are included in the new edition of this invaluable directory. Most of the organizations included are American based but a few foreign groups are included, for instance those for which there is no United States counterpart or those which are felt to be of particular interest to Americans and international organizations with a large membership in the States. Non-membership associations which are actually commercial organizations are included on a selective basis if their names suggest that they are voluntary membership groups.

Each entry in Volume 1 usually gives the full name of the organization and the abbreviation, the address, date of foundation, number of members and staff, brief details of the aims of the association and the titles of publications. The *Encyclopedia* is arranged in broad subject sections: there is also a useful section giving very brief details of inactive and defunct associations and changes of name. The index is alphabetical by the full titles and title key-words of the organizations. An index to the abbreviations of names would be useful.

Volume 1 of the *Encyclopedia* gives detailed information about organizations. Volume 2 is a geographic and executive index to the main volume. *New Associations and Projects* is the title of volume 3 which is an updating service supplied quarterly in the form of booklets which fit into a binder.

DELMAS/HARRAP BUSINESS DICTIONARY. English/French, French/English. Compiled by Georges Anderla and Georgette Schmidt-Anderla. Paris: Delmas; London: Harrap, 1972. 587 pp. £12.00. (ISBN 0 245 50976 3.)

The compilation of this dictionary, it is stated in the foreword, took some ten years. Although this lengthy period may involve some drawbacks as far as the currency of some of the terms is concerned, one would hope it confers reliability on the usage of the terms and phrases as given.

It is hardly possible to define the sphere of business so strictly that terms from other disciplines are excluded. In this work there is no attempt to do this. The 70,000 entries cover economics, law, statistics, applied mathematics, cybernetics, computer programming, automated management systems and related fields. A UK/US notation is used to distinguish specifically English/American phrases or terms, and certain concepts which have no exact equivalent in the other language are also clearly marked.

The compilers claim that this is the 'first reasonably comprehensive thesaurus of both the Anglo-American and of the French business language'; in this guise, as well as the obvious one of a comprehensive English-French/French-English dictionary in business, economics and related fields, this volume should prove extremely valuable.

UNION LIST OF STATISTICAL SERIALS IN BRITISH LIBRARIES. London: Library Association, 1972. 86 pp. £2.50 (ISBN 0 85365 076 4).

This is the union list of statistical serials regularly received by public, university, professional associations' and government libraries mentioned in the review of the previous product of the LA–RSS survey of statistical collections which appeared in *Aslib Proceedings,* February 1971.

More specifically, the list is compiled from responses to a questionnaire which included a checklist of current titles of all known statistical serials relating to the UK and its constituent parts. In effect the titles listed (alphabetically) are mainly Governmental, non-parliamentary, but included are the statistics produced by such bodies as OECD and non-official UK organizations such as the British Footwear Manufacturers Federation and the Furniture Industry Research Association. There is also one small section devoted to Parliamentary Papers, and a larger section to Overseas Statistics.

For each title locations and holdings are listed in an alphabetical notation coded geographically, corresponding to BUCOP symbols. The key to the codes with corresponding addresses, telephone and telex numbers is provided at the front of the list, and at the back is a subject guide in which entries are only included for items in which the title is not self-explanatory from the first words.

The rather long period (some three years) over which this listing has been produced has caused various difficulties, which are clearly explained in the introduction. For example, many Government departments have changed their names in this period; the titles covered in the list are basically those which were currently being published at the end of 1969—they are, however, entered under the titles they bore at the beginning of 1972, with cross-references where necessary.

An increasing awareness of the value of statistics in all sectors of the economy necessitates the ability to locate our resources locally and easily. This publication will help us do just that.

Structure of information services

D. V. Arnold

Intelligence Section Manager, ICI Ltd,
Petrochemicals Division

Paper presented at the 46th Aslib Annual Conference, University of Sheffield, 24th–27th September 1972

Introduction

It was originally intended that this paper should present a description of the traditional structure of an information service and an indication of how that structure changes as a result of introducing external information services. Although during the writing of the paper this intention has been kept constantly in mind, the author has found it impossible not to stray into describing changes of function and the resulting changes in attitudes on the part of information worker and user. This is for two reasons. Firstly, the resultant changes in function and changes in attitude are still very much in a formative stage, and until they are reasonably crystallized it would be foolish to venture too far in discussing possible changes in structure. Secondly, formal organizational structures are becoming outmoded in modern management practice; informality and the highest degree of flexibility are the latter's key notes.

Traditional organized structures

How are present-day internal information services organized? In detail there is of course fairly wide variation, but studies of services in this country and abroad show marked similarities in overall pattern. For those services that have to deal—and many do—with both published and confidential information, the first structural division is obviously into units dealing with these two aspects. This is almost automatically dictated by the need for careful physical separation of the two types of document and by the very different controls necessary for their handling and processing. Since this conference is concerned with *external* information services, the structure of that part of internal services dealing with confidential information will not here be considered, although it is appreciated that some external services exist that are concerned with information to which access is restricted.

At the next and further stages there is at least theoretically a choice between division by: (a) function, e.g. selection, abstracting, disseminating; (b) subjects, e.g. chemistry, engineering, economics; and (c) form, e.g. patents specifications, periodicals literature, audio-visual material. It is now only fair to admit that many of the subsequent points in this paper have a bearing only if reasonably large information services are being considered. Those of us who have gone through the experience of organizing a small service know only too well that with such a service a completely pragmatic approach has usually to be adopted.

With a small staff there are obvious difficulties in establishing even the barest structural division; the only language specialist may be the only engineer.

However, given a service that is large enough to allow for a reasonable degree of breakdown, there are certain factors that will influence the type of division. One of these is the degree to which the organization of the parent body, e.g. the company in the case of an industrial information service, should be taken into account so as to allow for the maximum of 'keying-in' of the service with its parent. For example, in a company that is product orientated in its organization there may be benefits if the information service is organized on a product basis at a fairly early level in its structure. Another factor is the large difference that often exists in the relative importance of certain subject fields that have to be covered by an information service: it may well be that the type of structure that is best for dealing with information in the principle subject area or areas is not suitable for minor fields.

To turn now to more detailed consideration, it has already been stated that for a surprisingly large number of existing information services there is a reasonably uniform pattern for their structure. To begin with there is usually a unit, sometimes regarded as the library proper, devoted essentially to the collecting function, to the general care of documents (books, periodicals, etc.), and to providing the required minimum of operational procedures to make the *physical* use of the material possible with maximum efficiency. One frequently then passes quite naturally to an 'analysis' function, in which individual documentary units are finely analysed. This function, together with the successive (on the time scale) function of synthesis (with the latter's division into synthesis for current awareness and synthesis for information retrieval), forms a significant part of the 'information' unit. The latter's remaining function is 'search' (the 'enquiry' function). Closely allied to these is a function that has developed during the last few years as a result of the application of computers to data processing in information services. This is systems development, which, because of its importance, is quite often an independent structural unit. However, because of its predominant (possibly mistakenly) pre-occupation with information retrieval it is sometimes included organizationally in the information unit. Lastly there is that odd bed-fellow the translating (etc.) function, which although sometimes contained in an independent unit is often a part of 'information'.

Thus, looking at the three types of structure (form, subject, function) referred to earlier, it is 'function' that appears to exercise the dominant role at the first level(s) of division. Why is this? Possibly the main reason lies in a too common attitude to information work in regarding it as first and foremost a service and only secondly as possessing a subject discipline responsibility. Also, this approach has been supported by the trend over many years to centralize support services instead of having them split up between operational units. There have, of course, been reactions to this and it will be interesting to see whether large information services, whilst *overall* maintaining a centralized service function to the parent organization, re-organize themselves on a subject rather than on a functional basis in spite of the obvious duplication that may ensue.

'Library' function

Since any information service depends fundamentally on the existence of a good library, attention will be paid first to the collecting function, the general care of documents, and the provision of the required minimum operational procedures to make such documents available with maximum efficiency. Priority for the 'library' function might also be claimed on the grounds that the library is usually highly dependent on external services in the form of the considerable reliance that has to be placed on the book and periodical stocks of other libraries. If it could now be accepted also that the most common structure of the library in question is by function, e.g. purchasing, cataloguing, borrowing, lending, the stage is set for a brief examination of the likelihood of change enforced by changes and/or increases in the use of external services. The most likely developments will relate to the stock in either of the following aspects: (a) selection, (b) purchasing, (c) cataloguing, (d) borrowing, (e) lending. Each of these will now be examined in a little more detail.

(a) *Selection*

The preliminary selection of titles to be examined (probably on approval), now done by library staff from the usual publishers' and booksellers' lists, may be largely replaced by an external computerized SDI service based on a group profile provided *to* an outside bookseller or suitable agent, even possibly on a national basis. The present rather broad selection groups now operated by booksellers will cease to have any value, and much of the medium scale screening now carried out by special libraries will be taken care of by the group profile referred to. It is unlikely that the screening will be able to go very much further; it will almost certainly still be important for the librarian to see the majority of the publications notified before a decision is made to buy. There will of course be obvious commercial and technical problems to be overcome, but these are matters of detail not coming within the scope of this paper.

At present most libraries/information departments have a responsibility to make sure that new publications relevant to the interests of a particular person are sent to him for perusal on being received, or at least notified to him. However, with the increasing use of personal SDI systems, the notification is likely to become less of a library responsibility. There are of course already examples where SDI systems give information not only on articles in periodicals but also on relevant books, pamphlets, etc., and the degree to which this notification will be made via an internal SDI system will obviously be related to the use already being made of such systems for periodicals literature. What is almost certain, however, is that the notification of new publications in these other categories should be made as sophisticated as that now holding for the periodicals literature in so many areas.

(b) *Purchasing*

The elaborate purchasing mechanisms found in some form or other in so many 'special libraries' may well be superseded by the use of an external purchasing agency which will take over what is after all a fairly straightforward clerical operation. In fact, some special libraries have already, by dealing with one supplier, transferred to the latter a considerable part of the work that such libraries did previously.

It is, of course, a matter for speculation as to how far the amount and type of material purchased may be affected by improvements and other changes in external facilities for borrowing. For example, a number of the items that are now purchased might more profitably be borrowed on a commercial basis for extensive periods of time, something of the order of twelve months. At the end of this period the major part of the demand will have been met and the future demands can be catered for by *ad hoc* borrowing. For the period of the twelve months the items would to all intents and purposes be regarded as library property. It would be desirable that in any scheme available through an external, commercial lending service, there should be an option to buy items at a reduced price at the termination of the lending period.

(c) *Cataloguing*

It is still doubtful, for some time to come, whether any great use will be made by special libraries of external cataloguing facilities, such as Marc tapes. Instead, much simpler internal systems will be devised, closely integrated with the purchasing operations and making such common use as is possible of the minimum bibliographical information required.

(d) *Borrowing*

If, and there would be every hope of this, the efficient service given at present by the National Lending Library for Science and Technology (NLL) continues, and even improves, this will have a marked effect on the special library's organization for inter-library lending. There are indeed already indications that the NLL, because of its rapid service, is sometimes used in preference to the specialist external library.

(e) *Lending*

The library's responsibilities obviously include the careful control of publications once they have left the library on loan. Few libraries of this kind can justify mechanization of this activity in-house, but it is conceivable that an external bureau, serving a number of special libraries, might control this activity on their behalf.

In all that has been said, consideration has been given essentially to the part that is being played by external services in helping the library to carry out its more or less traditional functions. In this respect the changes one envisages in structure are primarily the amalgamation of functions at present counted as separate, or even the complete disappearance of such functions when an external service is used to supply the service *in toto*. However, the arrival of information in the form of computer tapes, even if at present primarily of a secondary level nature, must obviously lead to a radical re-thinking of the library's traditional role in cataloguing and other fields. Once there is any serious invasion of the primary publication area by computerized format, then one could see the virtual end of the library's functions as they now exist. On the other hand one could imagine the library becoming the last guardian of the 'browsability' factor in the communication of information, since it is difficult to imagine any computer system giving quite the existing facility in this connection.

Linguistics function

To turn now to a sometimes rather neglected area when it comes to considering ways of development and improvement: the linguistics function and what it should include. Although the traditional activity of translating published foreign texts into English is obvious, there will be other activities both closely and not so closely related. That one of these will be interpreting almost goes without saying, and so far both these activities have related primarily to the impact of the external literature on those having to use information. However, the alternatives or opposites are also very important, namely the translation into foreign languages of texts produced *within* the organization. Although good knowledge of foreign languages and good technical knowledge are obviously just as much required as for translating *from* foreign texts, there is one important difference. It has been found by many of those experienced in translating from their native language into foreign languages that a good critical sense of their native language is essential. Indeed, one of the best tests of the clarity of a text in any language is to try and translate it into another. This means that the linguistic function of translating and interpreting can usefully be associated with the editorial functions of technical material that are so often found as one of the duties of an information service.

How are external services used in this area and how does that use affect the organization? Obviously external translating services can and are being used quite extensively by information departments, and the meshing-in of external language services is comparatively easy as long as at least one person is already engaged on providing an in-house language service at some reasonable level. This is vitally necessary if there is to be the most efficient use of external services and a constant and highly critical assessment of their capabilities.

However, in-house oral translating has for many years played an increasingly important role and has put the traditional external services at a disadvantage. It is indeed extremely difficult to see how this method could practicably be provided by an external service. Quite apart from the obvious disadvantages regarding speed and general convenience, matters of security would be even more difficult, since in the exchange and mutual co-operation that goes on between an internal translator and his client during an oral translation, there are bound to be interchanges of confidential information relevant to the translating job in hand.

Information function

It is now time to consider the activity that has probably above all others been affected by the increased availability of external services, namely the information service proper.

The information activities will usually be organized on a subject basis; even in the smallest services there may be an attempt to divide by subject, however broadly. Whatever the basic necessity for doing so may be, it is likely that this will be inevitable by virtue of the differing academic specialities of the staff employed. Instances do, of course, exist where information services are divided according to function (e.g. indexing) and/or form (patents), though of course the latter may well exist as a further sub-division of a fundamentally first division by subject (e.g. scientific and technical; commercial). This is an interesting subject on its own and cannot be examined further here.

Until the coming of computerized SDI services, the facilities for current awareness of scientific and technical information were on a comparatively broad basis only, and the close relationships existing between articles contributed from a variety of sources were not easily apparent. Although other factors obviously played a major part, such as the need for faster communication, the broad sub-divisions used by the normal commercial services had their effect in encouraging research workers to establish the 'invisible colleges'. However, computerized SDI services supplied from outside are by no means necessarily the final or even the best answer, and it must be acknowledged that much of the pressure to use them has been dictated by financial stringency. For example, it is not insignificant, in view of the creative attitude to developments in information science that has so often been the hallmark of those engaged in the pharmaceutical industry, that a group of fourteen of their industrial information centres in the US have decided to continue their own indexing-abstracting operations.[1] Some of the difficulties arise because external services are not subject to sufficient quality control. Many are developed by commercial organizations that have little appreciation of the standards of quality expected by the professional information scientist.

Another, and almost more fundamental, question is what digestion is necessary, allowable, or even advisable before current awareness material goes to a potential (definite?) user? The answer to this question may markedly affect the continuing role of information scientists in an information service. How far are they to continue to act as interpreters of even secondary(!) literature? Is their function as regards current awareness to end once a profile has been constructed, apart of course from necessary running modifications to keep it in line with changes in outlook and changes in terminology? These questions are symptomatic of a radical change that may be taking place in the relationship between scientific and technical information and the ultimate user, which must in turn have its effect on the structure of information services.

It would appear, however, that for many users of information there is no longer a need for them to be fed by some 'in-house' service with a carefully selected and well digested series of 'signposts' to the current literature. If such users are content to be provided with less detailed information, they can now have brought to their desks, on a regular basis, references to the current world literature on their particular interests with practically no effort at selection on their part. In theory, in spite of world coverage, the number of such references and the total number of words that the user need read should be no greater than before, allowance being made of course for the continuing growth in world output. This is because—ideally at any rate—a modern SDI system (often based on an external service) should give less 'noise' and usually provide the users with briefer information than the abstracts to which they have been accustomed, though a few computerized SDI services do provide abstracts. Here one should warn that the information provided by a mechanized SDI system is not necessarily better or even as good as that obtained from the more traditional non-mechanized service.

If it is accepted, and it is indeed a big 'if', that this will be the future situation in many branches of science and technology, then there will inevitably be changes in the functions of the information scientist. It implies less demand for him to be a selector and abstractor of current information; indeed his contacts with the current literature will probably decrease. Instead he will have to accept the role of interpreter for a function as much as for a subject area. This function will comprise the critical examination and selection of external services, skill in the construction of profiles, and the ability to interpret the limitation of computerized information systems to practising scientists and technologists. The information scientist will need as part of his armoury a comprehensive knowledge of many new sources of information, most of them being of a secondary level and requiring new techniques for their efficient use. Although good subject knowledge will still be essential, almost as important will be a discerning appreciation of the logistics of computerized information processing.

Lying basically behind these requirements will be the need for the information scientist to be an educator. It is even now no longer possible for the scientist or technologist to say blithely that he is not interested in how the information he wants is acquired as long as he gets it. The new world of information no longer depends on 'order' or on a systematic and objective method of storage: rather, it is intensely empirical and coupled with its empiricism is a machine that is more stupid than any human being yet conceived, the computer. These two factors taken together mean that practising scientists and technologists have to be directly involved in the techniques of the 'information-handling' process. It is to help them in this involvement, to persuade them of the necessity, and if possible to get them interested, that the information scientist will need to exercise the educational aspect of his function.

This change in emphasis of the dependence of the scientist and technologist on the information scientists should lead to a blurring of the boundaries that in many instances still exist despite endeavours to break them down. Indeed, information scientists, through their authority as experts in modern methods of communication, now have a golden opportunity to obtain a greater integration with scientific and technical practice. Now in a very real way they can be equal and essential partners in the scientific or technical team, rather than being people performing a job for which the practising scientist or technologist has tended to regard himself as in some aspect trained and fitted to perform, but which only lack of time prevented him from doing. What one may witness is the information scientist changing from a grudgingly accepted economic necessity to an independent professional in his own right, an equal link in the scientific and technical communication chain and someone who, because of the breadth of the area he so often has to cover, has more chance to be aware than has the practising scientist and technologist of the dangers that can lie in too great a devotion to the pragmatic in the communication of information. Any further examination of this aspect would be an unwarrantable intrusion on the subject that is to be dealt with by Mr Rippon ['Skills required to select, interact with and exploit external services to fit the user's needs', to be published in the February 1973 issue of *Proceedings*], and one should now try to see what generalizations about structural change may be made.

It must be only too obvious that the major change is that there will be *less* structure. In the 'collecting' or 'library' area many of the present separate functions, which give rise to separate structural units, are already disappearing. The 'analysis' function, from which abstracting is derived, is on a rapid decline, as also to a significant degree is the 'synthesis' function concerned with current awareness and to a certain degree the 'search' function. In other words, the technological developments that are leading to this decline of several separately recognized functions, and thus of formal structures, are themselves helping information services to be more in line with modern management preaching, that is greater informality and less structure.

But we must make sure that these technological developments go hand-in-hand with the development of a new theoretical basis on which to build further. It is indeed ironical that information science, the handmaid of scientific research, should in a number of its present answers to information problems be providing technical but non-scientific solutions. In a paper presented in 1963 at the 37th Aslib Annual Conference, and which deserves constantly to be re-read, B. C. Brookes said: 'If information science is to live up to its claim to be a science, it must establish its own autonomous theoretical basis'.[2] Nine years later there are still too few signs that his comment has borne fruit.

REFERENCES

1 SOUTHERN, W. A. *and* WEINSTEIN, S. J. Indexing and abstracting services in the industrial information center. *J. Chem. Doc.* 11, 1971, p. 70–72.

2 BROOKES, B. C. Communicating research results. *Aslib Proc.* 16, 1964, p. 7–20.

DISCUSSION

In answer to a question from MR R. BEER (BP Chemicals) concerning Public Lending Rights, MR ARNOLD said he was in favour of organizing some contribution to the author, and any lending organization such as he had suggested should make some payment, possibly on the basis of a loan peroid.

MR R. SEWELL (British Steel Corporation) asked MR ARNOLD to comment on the question of staff size at which it becomes feasible to organize information services on a product-orientated basis.

MR ARNOLD said that experiments on such organization were in hand in ICI. Figures would obviously depend very much on local situations: with about nine professional staff a reasonable degree of product orientation could be arranged.

MR B. T. STERN (Wellcome Foundation) asked to what extent could the idea of a project team, having a changing membership (as with chemists being replaced by production designers who are then joined by marketing staff) but retaining a 'permanent' information scientist, be extended to a non-research environment.

MR ARNOLD said that where there was no clear programme, the information scientists had to try to get on to as many project teams as seemed desirable.

MR LESLIE WILSON (Director of Aslib) thought that Mr Arnold's stated objective of total integration of the information function into the research and development team was undesirably narrow. We were already living with some of the disadvantages of the historical accident that information services had evolved mainly in a research and development context with the almost exclusive emphasis on scientific and technical information. The principle need for expansion of information services during the coming decade was likely to be in the economic, commercial and sociological fields. In addition, we ought to be concerning ourselves with management information or operational feedback, and with line communications. There was no difference of fundamental principle between these information activities and those which professional information staffs had traditionally pursued; yet they had been virtually ignored by the profession which then cursed its luck for being assigned a role approximating to that of a technician in a highly esoteric field of industrial activity.

Our objective ought now to be the integration of all company information activities into a single function, under a unified information policy and carried out by a professional information systems manager. The advent of the computer, a powerful integrating factor, could be welcomed as a potent instrument of this kind of professional development during the next ten or fifteen years.

MR ARNOLD said he agreed with almost everything that MR WILSON had said. He should have made it clear in his paper that although he had cited research and development specifically, he had assumed that there would be similar integration in all areas where information expertize was required. With apologies to 'women's lib.', it was rather like using 'he' as a generic for 'he and she'.

THE CHAIRMAN (MR R. C. WRIGHT, Royal Aircraft Establishment) interjected that we should, nevertheless, be grateful to the information workers in science and technology who had pioneered information services.

MR ARNOLD replied that it was difficult to define browsability without replacing it by another word that also needed defining. It had connections with serendipity, but an example would be clearer. If a chemist were looking up a reference on page 428 of a journal and found another reference of greater interest on page 474, which had nothing to do with the first, then this was a form of browsability which should be preserved. On the second question, he thought browsability was more important for the users, but that any information scientist worth his salt should spend time browsing, for example by reading *Nature* and *Science*, in order to widen his attitudes. MR ARNOLD expressed regret that, in his opinion, browsing was not increasing, probably due to pressure of work. Regarding the use of citation indexing for browsing, he did not think he was sufficiently informed to give an opinion.

DR L. A. DE GEUS (CIBA-GEIGY, BASLE) asked four questions relating to the speaker's comments on browsability: (1) What does browsability mean in practice? (2) Does it apply to the information officer or the user? (3) Is browsability increasing? (4) Does citation indexing promote browsability?

MR P. O'N. HOEY (J. Lyons and Company) said that he would like to try and tie together Mr Wilson's contributions and Mr Arnold's paper, as follows: Whilst he agreed that it was essential for information/library workers to establish operational activities in all fields of business, from the conventional research to accounting, marketing, etc., he thought that in whichever of these fields the operation occurred the information/library worker must identify himself closely with the practising men and women of that field. He must be able to integrate himself with whatever the 'bench' happens to be: a computer, a market research bureau or traditionally the test-tube type bench.

In any event information/library workers had to adopt a different role, change the structure which currently existed; and yet it had been said that in ten years the profession had not yet established a basic starting point for itself. Establishing this starting point entailed getting into the job grades of one's organization easily, so until this happened it did not make sense to try and change the role or the structure. In a small information/library unit such as his own, it was very difficult to establish a comparative status for his profession. He wondered if in larger establishments like ICI, Unilever and British Steel Corporation, the problem was any smaller, if only because of the sheer weight of numbers of information/library workers who were able to create a good impression at several levels of the organization.

MR M. S. DALTON (Unilever Research) agreed with MR HOEY that information services should become more closely involved with the people they are serving. The profession had worried a lot about status and less about the value of the information being passed on. Perhaps both of these may be improved by becoming more closely involved with the scientist. He saw the information function as being in two parts: (1) alerting scientists with titles; (2) the analysis/intelligence function—which involves digesting the information.

MR ARNOLD agreed that the profession had been too worried about its status. He said the more one could integrate with one's user groups then the more likely one would evolve a structure compatible with the structure of the total organization. In addition, as some of the functions dwindled or became simplified the unit would become more flexible, and more capable of adapting to demands and new structures.

External sources of information: the kinds of services and facilities offered and criteria for evaluation

B. C. Vickery

Assistant Director (Research & Development),
Aslib

Paper presented at the 46th Aslib Annual Conference, University of Sheffield, 24th–27th September 1972

EVERY LIBRARY or information service is at bottom wholly dependent on sources of information external to it. It must acquire from outside all the documentary information that it transmits to users. But at this conference we are thinking more particularly of external agencies that provide material or services that might and could legitimately be provided internally.

Many of the papers that follow will be specifically discussing one particular type of external source: agencies that produce files of references in machine-readable form. These agencies will either sell magnetic tapes or search them on request. But I would like to set such sources in a wider context, and think of the whole range of services that may be provided externally.

There are four types of output that may be sought by the user of a library or information service: he can seek a document; a reference to a document; information or data that may be contained in documents; or the identity of an institutional source of documents, references or information. A library can aim to meet all such demands from its own internal resources by providing:

- a comprehensive local collection of documents;
- a complete local index with references to all documents of potential interest;
- an information service to dig out any requested data from its store of documents;
- a complete local listing of institutional sources that may be contacted.

In practice, of course, very few libraries can attempt to meet all demands and external services are used to supplement internal resources.

To remind ourselves of the range of external sources upon which we draw, let us set up a tabulation in two dimensions. One relates to the type of output, as already mentioned, and the other to the scope of service demanded. The user can seek a response to a specific query; a continuing current awareness service; or access to a cumulating file in which he can browse. Combining these two dimensions gives us twelve types of source (Table 1).

Instead of acquiring a comprehensive document collection, we can rely in part on interlibrary loan (including, of course, photocopies), 'on approval'

TABLE 1: *The range of external sources of information*

TYPE OF OUTPUT	SCOPE OF SERVICE		
	Response to specific query	*Continuing current awareness service*	*Cumulating file for browsing*
Documents	Interlibrary loan	'On approval' supply	Reference library
References	Bibliographic centre	Bulletin, notifications	Reference index
Information, data	Data centre	Data bulletin	Compilation
Institutional sources	Referral service	News bulletin	Directory

from booksellers, and consultation of external reference libraries. Rather than ourselves making a complete local index, references can be obtained from a bibliographic centre (e.g. MEDLARS), in regular bulletins (e.g. *Physics Abstracts*) or as SDI notifications, and in cumulative indexes (e.g. those of *Chemical Abstracts*). Detailed information can be sought from data centres (e.g. the Materials Technology Bureau at Harwell): some of these centres regularly produce bulletins recording new data, and many data compilations are available. For identifying institutional sources, a library can rely on an external referral service (such as Aslib Information Department), bulletins announcing new sources, and directories (such as *Technical Services for Industry*, published by the Department of Trade and Industry).

Looked at it in this light, it is obvious that libraries have long been familiar with the problem of using external sources. Why are we holding a special conference about it at this time? There are a number of good reasons. First, even among the well-established external services, considerable changes are taking place—for example, the National Lending Library has vastly affected interlibrary loans, and the development of the Lending Unit of the British Library is going to alter the situation further. Second, external resources are becoming important in the new subject areas—look, for example, at conferences held this year and last by the Social Sciences Group of Aslib; at the growth of interest in commercial and economic information, including the European market; at services supplying product data, or at the development of technical data centres. Third, there is such a variety of new services emerging that it is difficult to keep track of them, and librarians themselves need a referral service.

The remaining two reasons for a concentrated consideration of external sources are more closely connected with the detailed discussions that will ensue at this conference. First there is the very rapid growth of material in new physical forms—microform, and even more disturbingly, machine-readable form. Second, the costs of external services—though they have always been with us—now have to be looked at very carefully in comparison with in-house alternatives.

Table 1 has given a bird's-eye view of the kinds of external service available to the librarian. Among exhibitors at this conference can be found examples of many of the types that I have indicated. Ruth Finer of Aslib Information Department has prepared a detailed account of the major computer-based services available in the UK.[1] There is little point in my trying to analyse this wealth of information, which you can each study at your leisure. But I would like to make a few general remarks about the computer-based services.

The list that has been prepared by Aslib rightly concentrates on the main tapes available—forty-eight of them. Nearly all of the tapes contain files of bibliographic references, but a few of those listed record data—those of the Crystallographic Data Centre, the Mass Spectrometry Data Centre, and Dun's Market Identifiers (data on UK companies). Even a scan of this list may not immediately reveal what a vast mass of references is now available on tape. A conservative estimate is that 3½ million machine-readable bibliographic entries are now being recorded each year, and the total number of such entries on tape by the end of 1972 will be 24 million.

The recording of *data* on tape is also growing. A few further examples may be given: (a) the Electronic Properties Information Center in California has two tape files, one bibliographic and the other recording the properties of semiconductors and insulators—last known purchase price is $3,500; (b) the magazine *Fortune* has a tape file of statistics on the largest US industrial companies, leasable at $1,000 a year; (c) Science Data Bank Incorporated has recorded on tape the properties of organic compounds from the well-known *Handbook of Chemistry and Physics.*

The Aslib list notes the existence in the UK of computer centres that will provide current awareness (SDI) or retrospective search services—for example, MEDLARS, UKCIS and INSPEC. This is a pattern developing in other countries, and of course the librarian is not restricted to using services in his own country. In the USA, there is the Institute for Scientific Information, also services at universities in Connecticut, Florida, Georgia, Illinois, Indiana, Kansas, Ohio, Pittsburgh; and those of Information Interscience Incorporated (3i). In Canada there are the National Science Library and the Research Council of Alberta. On the European continent there are services in Copenhagen, Stockholm and elsewhere. Just coming into serious use are systems for on-line consultation of computer files such as SCISEARCH for current ISI tapes, and the ESRO Space Documentation Service.

Many of the speakers that follow in this conference will be concentrating on the problems presented by computer-based external sources, although some pay attention to printed sources such as abstracts. I hope that there will also be opportunity to discuss some of the other types of service shown in Table 1, particularly those that provide social and commercial information. It is clear from papers presented at recent Aslib meetings that there are considerable problems and opportunities here.[2–6]

For the purpose of these discussions, I have defined our concern as 'external agencies that provide material or services that might and could legitimately be provided internally'. The use of such external sources raises four main types of question:

1. *Content*—does their content adequately match local information needs?

2. *Form*—does their physical form create handling problems?
3. *Cost*—is their cost competitive with alternative sources?
4. *Consequences*—what effects will their use have on existing services, directly and indirectly?

The *content* of an external source is first of all a matter of its *coverage*. Is the range of documents, references, data or institutional entries that it offers likely to cover local needs? To answer this question may require some careful sampling of the potential source and comparison with a known local demand. If the source is to be purchased outright for retrospective search—a reference index, a compilation or a directory—then one must also consider what proportion of it is likely to be relevant locally and how much unwanted material the source contains. It is rare indeed that a single external source, of any kind, will give adequate coverage. If alternative sources are available, more sampling and comparison are necessary to assess their overlap and relative value.

There are other aspects of content to be taken into account in evaluating external sources. First, their *currency*: how up-to-date are they? how recent is the information supplied in response to specific queries or as current awareness? how frequently is a cumulative file updated, or a new edition produced? Second, their *presentation*: for example, services providing references may not include abstracts, which may be considered essential for local needs; data compilations may be organized in ways that do not suit local users; indexing may fail to analyse documents from viewpoints of local interest. Third, can one ascertain anything about the reliability of an external source—is its content accurate? does it always give prompt service? can one be sure that it will endure and will not be closed down for economic or other reasons?

External services come in varied physical forms that may create *handling* problems. All librarians have suffered from the loose-leaf compilation that must be painstakingly updated. Documents on interlibrary loan may arrive in microform, readable only by an apparatus situated within the local library. Computer-produced reference lists can be on clumsy paper sheets. All such variant physical forms create difficulties, increase local handling costs, and may not be readily accepted by the user. The outstanding example of a physical form with special handling problems is of course the file on magnetic tape, and you will be hearing a great deal about this from later speakers.

Even if an external service is adequate as to coverage, currency and presentation, is reliable and can be handled without too much difficulty, there is still the question of *cost* to be considered. This is a difficult area of evaluation, because it is not just a question of the purchase price. One has to think of the whole cost involved in acquiring, handling and making available a particular service—whether it be interlibrary loans, external abstracts journals, data compilations, or references on tape. Further, one has to compare this cost with that of alternatives—other external services or the cost of providing the service internally.

Such comparisons are not easy. Consider interlibrary loan: when is it cheaper to borrow rather than to buy? or to obtain photocopies of articles? Quantitative discussions of these questions have been published, but they depend on collecting a fair amount of data about the use patterns. What are the relative economics of scanning primary journals to build up a local index, or relying on an externally-produced indexing service—whether computerized or not? Or consider a very expensive data and reference compilation, such as Beilstein's handbook of organic chemistry—what is the true cost incurred if one does *not* buy it? What extra search effort by library staff and users will be involved?

One last aspect of using external sources is important in evaluation: what *consequences* will they have for the existing service and its users? The effects can be complex. Any marked dependence on external services will of course considerably alter the work pattern in a library: interlibrary loan may be accentuated in relation to acquisition; the volume of local abstracting and indexing may be drastically reduced; expert knowledge of external sources may become more important; if mechanized search of externally produced tapes is introduced, expertise in computer use has to be developed.

There may be second-order effects. Suppose, for example, that computer search of tapes produces a host of references that would not otherwise be discovered locally. The reading patterns of users may change, no longer matching the local stock of documents, and creating an increased demand for interlibrary loan and photocopies—with consequent increase in costs. If the library staff are no longer required regularly to scan incoming journals for indexing, will their familiarity with current subject developments decrease, making them

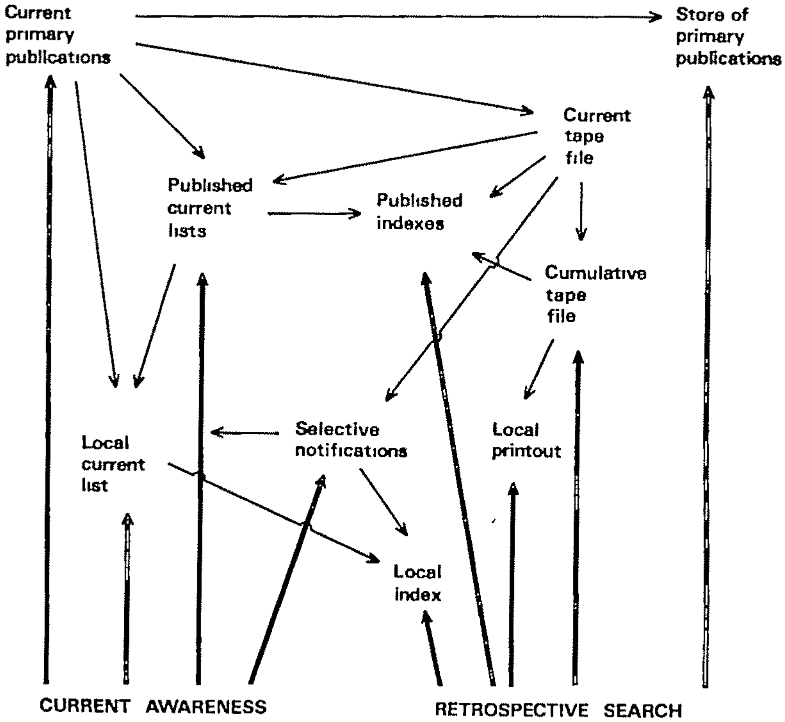


FIG. 1: Meeting local needs for current awareness and retrospective search

less effective in reader service? If on-line search facilities are introduced, is this going to mean less reference search for library staff (users will themselves sit at the terminals) or more (users will not want to spend their time at the terminals)?

We need to know a great deal more about the costs and consequences of using external services. Let me concentrate on just one set of possibilities, outlined in Figure 1. It shows various modes of meeting local needs for current awareness and retrospective search. Current primary journals, circulated or displayed, are the simplest mode of current awareness, and a store of them is built up for back search. A library may rely on further external services—published current lists and indexes. However, most libraries also rely on locally produced lists and indexes, built up by scanning current publications. The situation is now complicated by the availability of lists and indexes on magnetic tape. These tapes are used to produce published lists and indexes, but can also be used as a source of selective notifications, local printouts, and responses to queries.

All the ascending double lines in the figure represent different modes of providing for current awareness or retrospective search. In Aslib Research and Development Department, we have been doing a fair amount of thinking about how the costs and consequences of using each mode might be explored. How is the individual information service going to choose a cost-effective mix of uses? We visualize the possibility of getting the co-operation of a group of industrial firms, with whose help we could collect data on costs incurred and consequences encountered, as a series of case histories. From such data we would hope to develop a generalized quantitative model, from which guidance as to choice in particular situations could be obtained.

I have tried to present a summary view of the range of external services upon which we can draw, and of the evaluation problems that they create. There is little doubt that the continuing growth of the 'information industry' is going to present us with an increasing variety of services—some cheap, some expensive—and that ever more careful and quantitative judgement will be required in choosing among them.

REFERENCES

1 FINER, R. *A guide to selected computer-based information services.* London: Aslib, 1972.

2 Conference on commercial intelligence. *Aslib Proc.*, 21, 2, Feb. 1969, p. 59–102.

3 HENDERSON, G. P. Commercial information. *Aslib Proc.*, 22, 4, April 1970, p. 135–42.

4 Conference on primary materials in the social sciences. *Aslib Proc.*, 23, 4, April 1971, p. 166–206.

5 Conference on the British Library and the social sciences. *Aslib Proc.*, 24, 8, August 1972, p. 445–82.

6 Sources of information about the European Economic Community. *Aslib Proceedings*, 24, 9, Sept. 1972, p. 501–36.

DISCUSSION

MR B. T. STERN (Wellcome Foundation) made a plea for the inclusion in any cost evaluation of an external service of an accurate figure for the costs incurred by an organization in using the service internally. He had found that in a particular field, some apparently cheap services did not fall within justifiable cost levels, solely because the service came in what was for his organization's purposes a form difficult to manipulate.

MR V. BISKE (Burmah Oil) urged that simpler sources of information such as public libraries and local offices of Government departments should not be overlooked. He also expressed surprise that it had been thought necessary to put on tape the data contained in the *Handbook of Chemistry and Physics,* since this was already available in an easily-handled single volume.

MR VICKERY agreed that in his view a computerized version of the *Handbook of Chemistry and Physics* was unlikely to be able to meet the requirements for quick and frequent search as effectively as a printed version. However, it seemed likely that in the course of time a great deal of data would not be available in any other than a machine-readable form; as an example, the data collected by Garvey and Griffiths in the course of their investigations of information exchange among psychologists and others was only available on tape, for manipulation and re-analysis by other researchers.

DR B. G. DUTTON (ICI Mond) suggested that, now tape services are beginning to receive wide acceptance and use, the next problem is to provide facilities for transferring relevant items from a wide selection of services to in-house tape systems without further key-punching.

MR VICKERY replied that some services, such as Compendex, were already willing to provide selections on tape, but the problem of integrating the selections with a personal system still remained difficult.

DR W. E. BATTEN (UKCIS), in agreeing with Mr Stern's suggestion, wished to add a plea that, when we are told how cheap it is to do a job in-house, we should also be told whether the librarian is being charged for accommodation, use of the Xerox, computer time, electricity charges and other overheads. It seemed to him that there was plenty of cheating going on by proponents of both sides of this particular argument.

MR R. BEER (BP Chemicals) wished to know how the small information unit without a computer would be able to get its data in future; would there ever be a Central Data Bank which could be accessed by telephone?

MR VICKERY replied that single service which would do everything anyone wanted would never be supplied, because it would be hopelessly uneconomic and inefficient. It is the whole complex network of information services of all kinds which will provide this service, as in fact it does now, and the best approach to the problem is to develop the whole network concept so that every information unit can contribute its expertise for the benefit of the community.

MR F. LIEBESNY (Transociates) stressed the difference between cost and cost-effectivenesss, viz. that the latter should include some evaluation of the effectiveness of the information obtained. He urged Aslib to extend its published survey of available tape services to include all secondary services available in the UK. He also wished to mention the role of the language consultant, who does more than translating and interpreting, but also advises on abstracting, indexing, etc., of foreign language material.

MR VICKERY agreed with the need for cost-effectiveness measurement. Cost was only one aspect of evaluation, and problems of content, handling and consequences all related to effectiveness. If all these things could be combined into one cost-effectiveness figure, then we would have a very adequate measure for assessing the different ways of handling one's problems.

MR L. WILSON (Aslib) welcomed Mr Liebesny's remarks about the role of Aslib in surveying and describing external services for the benefit of members, but he also saw a necessity to define Aslib's operational role in relation to external services for their further benefit. Members accepted the function of Aslib's Information Department as an entry point into the network of conventional services. Was the same principle applicable to entry to mechanized services? There was undoubtedly an analogy between Aslib's established training function and the advanced training, advice and practical help that Aslib could give in relation to the effective use of mechanized services. He and his staff were studying the nature of the membership's needs in these respects but the guidance of members themselves would be a valuable contribution to these studies.

MR A. C. CLARE (GKN) wondered whether the whole area of cost-effectiveness was not impossible of quantifiable measurement, for example, how could one apply numerical value to upper-case computer printout versus a well-produced printed bulletin.

MR VICKERY agreed that the whole area was a difficult one, which was why he had spoken of 'consequences' rather than 'effectiveness', and benefit considerations inevitably relied heavily on subjective judgment. The fact that measurement in this area was difficult was, however, no reason why we should not attempt to do it.

MISS C. HALL (Thompson Organization) asked whether Aslib could provide some form of evaluation of external services for its members.

MR VICKERY replied that in general, in evaluating services, one can only evaluate from a specific point of view; that is to say, one has to decide if a service is valuable in a specific situation, for a specific set of needs. The most Aslib could do in the general sense would be to provide evaluation by precise, clear and full description, so that a prospective user could assess the extent to which his needs matched the description. There is no possibility of Aslib in effect putting a five-star label on one service and a one-star label on another; there are circumstances in which one prefers a one-star hotel to a five-star one, and all evaluation depends on the needs of the individual user.

MR P. J. WAY (Esso Petroleum) asked whether any efforts had been made to quantify the value of information services to research workers or others.

MR VICKERY said that the problem of measuring value was very severe. Information services are often serving a Research and Development activity, which is itself not directly a money-making activity, and the distance of the information service from the profit-making end of a process made it hard to put a money tag on its value. Some exploratory work, as for example assessment of value in terms of time saved, had been done, but even this was difficult to quantify, because to an individual, information acquisition is a continuous process, and to isolate the system contribution to his information input is not only very hard, but also involves a lot of interference with the individual. Nevertheless, the effort to quantify value would continue.

MR D. V. ARNOLD (ICI Petrochemicals) observed that we seemed to be worrying too much about values judged in terms of pounds and pence. There are signs that the wheel is beginning to turn very slightly in the other direction and that certain important values are beginning to be accepted as matters of judgment. It was his view also that we should be far less disturbed by accountants if we could face their questioning with details of actual costs. Unfortunately, information people have only too frequently been unable to produce well-founded cost figures. It also pays to know how much an external organization would charge to provide an existing internal service.

In closing the discussion, THE CHAIRMAN (MR M. J. TERRELL) said that one problem was that of the overlap in coverage of the machine-based services, because in some situations it was possible to find oneself buying the same item several times. Another problem was that of adding material generated in-house to an outside service, because frequently an external service was complementary to, and not a substitute for, an existing internal service.

The use of external data bases to extend current awareness services based on internal resources at AERE Harwell

T. E. Terry and P. J. Jones

Information Officer and Deputy Information Officer,
Atomic Energy Research Establishment, Harwell

Paper presented at the 46th Aslib Annual Conference, University of Sheffield, 24th–27th September 1972

MOST OF US in the last few years have been faced with providing information services with reduced staff and smaller budgets. I will describe how we have met this problem in an information service operating in a large research establishment, particularly by introducing a computerized SDI system, partly to replace, partly to extend, a current awareness service based originally on an extensive visual scanning of the literature.

I hope that this paper and others you will hear will provide a range of practical experience that will cover aspects that impinge on your own problems, and that from them a few signposts may begin to be visible. I would like to stress that this paper will not be a tidy summary of a completed operation. We are very much in the middle of it, still learning and still changing.

Harwell is part of the UK Atomic Energy Authority and employs a staff of about 5,200, of whom about 1,100 are qualified scientists and engineers; it spends about £15 millions per annum on research and development. About 30 per cent of the Harwell work is directed at or closely associated with the UK nuclear power programme.

During its first few years, Harwell's main task was to establish the scientific background required for the design and construction of the production plants for fissile material. In the 1950s, the Harwell programme included work on the development of nuclear reactors as producers of economic power, on the production and marketing of radioisotopes, and on fusion. This necessitated involvement in a wide range of subjects, and in the 1960s Harwell emerged as a multi-disciplinary, multi-purpose research and development laboratory.

In the late 1960s it was conceded that nuclear power was proven and established and no longer needed such a big research effort. The decision was taken therefore to make a major change in Harwell's programme and to embark on research and development which would be closely linked with industry and strongly market-oriented. The decision was consistent with the policy of the Minister of Technology, as he then was, to redeploy government resources and funds to more immediate and short-term research.

Figure 1 shows in broad outline the three main areas of work at Harwell and the massive redeployment of professional manpower which has been brought

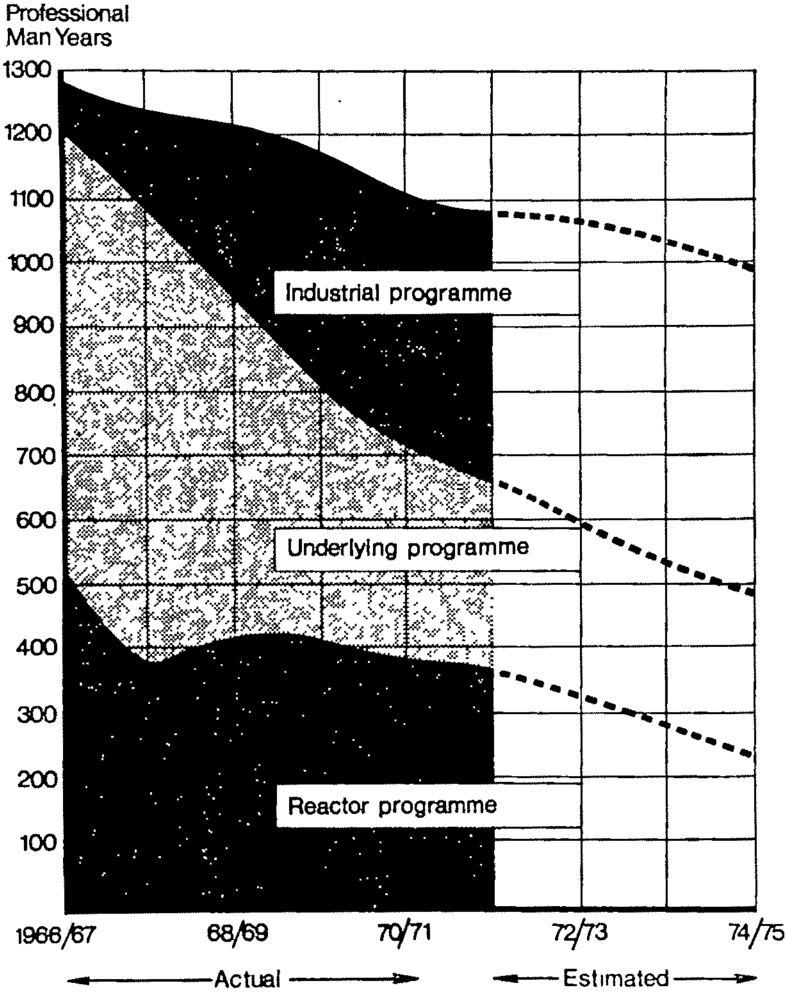


FIG. 1: *AERE Harwell—Professional manpower on programmes.* (Reproduced by permission from *Atom,* 185, March 1972, p. 44.)

about over the past five years. Effort on the Industrial Programme has been increased from about 5 per cent in 1966/67 to about 40 per cent with a further increase anticipated for 1974/75. The Reactor Programme has remained fairly constant and the Underlying Programme has been reduced by over a half. The figure also shows the reduction in professional staff which has occurred since 1966/67.

Up to 1968, the Harwell Information Service was entirely a manual (or visual) system. The current awareness service was based on a weekly information bulletin which was supplemented by individual notifications of journal and report literature. Items for the bulletin and notifications were selected from the literature by visual scanning. At a very rough estimate, this involved searching over half a million journal articles a year and also some 65,000 reports, of which 15,000 were scanned directly, but the majority through secondary sources.

As the new programme of work at Harwell began to develop in the late 1960s and early 1970s, it became clear that the standard of the information services would deteriorate seriously if they attempted to provide for the interests of the whole of Harwell by the well established manual methods.

Table 1 shows the total number of professional staff allocated to the central information services since 1966/67. The number for 1971/72 shows a reduction of just over 20 per cent on that for 1966/67 for the total professional staff, but of nearly 40 per cent in those providing a service. Compare this with the overall reduction in professional staff of a little over 15 per cent shown in Figure 1. The effects of cuts in staff have been compounded by cuts in expenditure which limit the use that can be made of commercial services.

TABLE 1: *Harwell Information Office—Professional Staff*

Year	Providing Information Service	Providing U.K. input to international nuclear information systems	Total
1966/67	9	0	9
1967/68/69	8½	1½	10
1969/70	7½	1½	9
1970/71/72	5½	1½	7
1972/73	5¼	¾	6

Table 1 also shows the number of staff engaged in providing input to the International Nuclear Information System and *Nuclear Science Abstracts,* work which has made inroads into effort available for internal services. In return for such work we are supplied with the magnetic tapes from which we can provide computerized SDI.

Experience at Harwell has shown, and this is supported by Sabel's studies in the 1960s,[1] that more use is made of formal information services by applied projects and that projects engaged in basic research tend to use their own resources. The redeployment of professional staff away from underlying research to applied research has probably increased significantly the total number of potential users of the information services.

From January 1969, a regular supply of magnetic tapes for *Nuclear Science Abstracts* (*NSA*) was offered by the USAEC as part of a collaborative agreement, under which the UKAEA abstracted and indexed UK published material for *NSA*. An experimental SDI source using the tapes was set up by a visiting consultant who had taken part in the establishment of an identical system using the same tapes at the University of California, Berkeley. In the first year of operation over one hundred users, most of them Harwell staff, were put on the service.

Until the availability of the *NSA* tapes, no attempts had been made to establish computer-based services because the interests of Harwell were so wide that no one tape covered them, and we had carried out studies which showed that it was not worth the effort of setting up an independent service. Experience of SDI services was limited to participation in experiments run by Euratom and by Inspec, and to a profile with ISI. The early experiments with the *NSA* tapes which were carried out under OSTI sponsorship demonstrated the acceptability of an SDI service from these tapes.

We therefore found ourselves in the situation where:

(1) the current awareness services based on visual scanning had to be reduced;
(2) we were being asked to provide services in a wider range of subject areas and despite the overall decrease in staff at Harwell the demand was, if anything, increasing.
(3) we were being asked increasingly for information relating to the commercial exploitation of R & D and this involved scanning news and other material not included in any data base.

However, the data bases will certainly cover articles from journals of the learned societies and similar literature, that is, just the literature that is of primary interest to the scientists working on underlying research or research related to the reactor programme. Our experience with SDI from *NSA* tapes had already shown that in such fields scientists who had been used to receiving a tailor-made notification service based on visual scanning and the close understanding by information staff of their interests were prepared to accept the lower precision of computer matching against profiles. We therefore decided to shift the emphasis of visual scanning heavily towards the industrial programme and to use computer SDI for the bulk of the individual current awareness in the other research areas. At the same time, to reduce costs, we explored the extent to which recipients would be willing to accept output from profiles written for a group of people with closely related interests.

For those of you who are not well acquainted with *Nuclear Science Abstracts,* I would point out that its coverage is very wide, including considerable areas of materials science, chemistry and medicine and biology for example. Nevertheless our interests at Harwell had extended beyond the scope of *NSA* and we had to look to the use we could make of other data bases whilst having very little money to make extensive use of them. It was agreed that the libraries of the whole of the UKAEA should co-operate and that Aldermaston, whose reliance on *NSA* is less than ours, should purchase the tapes of certain other data bases and supply an SDI service to the whole of the Authority from these tapes. They started with *Chemical Titles* and then added the Inspec tapes. We have less experience of obtaining access to other data bases, by subscribing to individual profiles with commercial services. The reason for this is that the cost would have to be borne by the users' Division and this introduced a marked bias against their use. Several scientists at Harwell participated in the early experimental profiles, but none decided to continue when they had to pay for them.

How then, has the planned extension of computer SDI worked out?

The number of users of the *NSA* service at Harwell has grown to 124 out of a total of 159. The majority of the Harwell users, seventy-seven, are engaged on the reactor programme. Industrial research accounts for the next highest group of users at thirty-one, with underlying research trailing with sixteen users. Eight of the profiles provide a service to a group of users. The *Chemical Titles* service operated by AWRE has twenty-eight users at Harwell while the Inspec service has twelve. Six of the Inspec users are also on the *CT* service. The main use of Inspec and *CT* services at Harwell has been to extend the subject coverage for the industrial projects.

The development of computerized SDI services at Harwell has proceeded very much as planned, although the manual system has continued to form the central core of the information service, with effort divided between the industrial, reactor and underlying programmes in roughly the same proportions as the scientific manpower.

The reason for this continuing need for the manual system in all areas is that most R & D projects have many layers of interests, some of which cannot be satisfied by any mechanized SDI service. Some interests are basic to a project and are fairly static, because they are concerned with established techniques. These are easy meat to a mechanized SDI service. Other interests are fluid and may change as frequently as once every six months. Examples are interests raised by the changing problems of the industrial customer. Technically, these may present no difficulties to the mechanized SDI service, but the effort of rewriting profiles and altering records may become quite unacceptable. Still other interests just cannot be defined in a profile statement. Examples are the impact of developments which may occur in the future, such as new processes or materials. These can only be satisfied by a system based on scanning by humans who are clever enough to see a potential interaction of two unrelated items of information, but are not clever enough to instruct a machine to do this. Some information, such as news items, is not recorded on the magnetic tapes available and, even if it was, it would be obsolete by the time it appeared.

Finally, and this is not the least of our reasons for maintaining visual scanning on such a scale, we do not see how an information service can continue to provide a live and effective service if its members do not have daily contact with the literature.

Having heard how we introduced and extended mechanized SDI to take its place in an overall system, you may be interested in a brief account of how it has worked in practice. The system came into operation on schedule, the tapes arrived regularly on time (except once when it was held up by the Customs) and in general we had little difficulty in running the tapes successfully, although we still came across snags, even after two years' operation. However, compared with the difficulties which we had heard many others had had, we felt we could congratulate ourselves. Then the blow fell.

Earlier this year, with little warning, a heavily revised thesaurus was introduced for indexing at the same time that *NSA* started using a new format and this meant changing from a numerical system for searching (each indexing term was given a code number) to the indexing terms themselves.

We had chosen to take advantage of the experience gained at the University of California and to use the simple procedure of matching against the code numbers, so we had to rewrite our programs to match against alphabetical index terms instead. At the same time we had to set about rewriting all the profiles to meet the large number of changes in the thesaurus. It is seldom realized how large is the investment that one has made in writing profiles. With a controlled vocabulary this can be brought home very forcibly if the vocabulary is changed.

We have come to the conclusion that it is better to set up a system which is as flexible as it is reasonable, rather than one which is as simple as possible. We intend to give ourselves the opportunity to match against any bibliographic element contained on the tape, whether it be index term, words in the title, author, or journal title, using natural language techniques. Such an approach offers the possibility of searching tapes from different data bases with the minimum of conversion. An example of such an approach is the system used by the Royal Institute of Technology in Stockholm which has been described by Dr B. V. Tell.[2]

We overcame or are overcoming these difficulties and at Harwell SDI has found its place and is being used to provide a regular operational service. It may not be at the forefront of the information service which, if it is to participate actively and intelligently in the work of the establishment, must be able to anticipate new interests and change direction rapidly. But it is being used to provide the base load, and to leave to the human system the more stimulating work of looking ahead and anticipating requirements, which in turn comes from working actively in the support of scientific teams engaged in research, and of teams engaged in selling a product, in this case research.

REFERENCES

1 SABEL, C. S., TERRY, J. E. *and* MOSS, J. H. Edge-punched card examination of retrieval patterns in information offices, and related investigations. *J. Doc.*, 18, 3, Sept. 1962, p. 111–32.

2 TELL, B. V., LARSSON, R. *and* LINDH, R. Information retrieval with the ABACUS programme. An experiment in compatability. Handling of Nuclear Information, Proceedings of a Symposium, Vienna, 16th–20th February 1970, p. 185–200. Vienna: International Atomic Energy Agency, 1970.

The use of external data bases to extend current awareness services based on internal resources at AWRE Aldermaston

P. D. Friend

Group Librarian, UKAEA Weapons Group Libraries

Paper presented at the 46th Aslib Annual Conference, University of Sheffield, 24th–27th September 1972

THIS PAPER is an attempt to give the picture of a somewhat different approach from that at Harwell. Descriptions of the systems and the data bases being used at Aldermaston have already been recorded in some detail, especially by L. Corbett,[1,2,3] and so will not be repeated here. I would on the other hand like to say something about the policy behind the decision to use external data bases, to include some more up-to-date assessments of the use being made of these services and their present costs, and finally some plans for future developments.

Before starting to write this paper I read Tom Whitehall's paper 'A future for the bulletin?' which he read to the Aslib Electronics Group Conference in June this year,[4] and I must say I felt like a hypochondriac reading the *Home Doctor*—I had just about all the problems cumulated in this paper from the questionnaires returned from some ninety special libraries. At least it was comforting to see that so many other librarians had tackled the problems in a familiar way.

There appears to be no disputing that the provision of some kind of current awareness service is a firm commitment of most information services: it is the methods used to supply these services that differ widely. So far there is no one system that is the undisputed answer. Neither is there even an accepted set of measurements or standards by which the effectiveness of a system may be determined, and since the final assessment must be the opinion of the user, it is likely to be difficult to define any units that will enable comparisons to be made of systems used by different information services.

So far it appears that the most effective information services are those that select from all the methods available, using as many, and in such proportions, as are found to be appropriate to their customers' needs, and to their own capacities. This has certainly been the experience at Aldermaston, and has led to a mixture of manual and mechanized systems, either initiated internally or using external sources. The proportion of current awareness service resulting from scanning current journals as opposed to services purchased from external sources, as well as the proportion that is manually as against mechanically compiled, depends on a series of factors. These may be simplified into the two basic categories of 'user needs' and 'supplier facilities'. Here the supplier is the internal information department or library. We should look at these two factors in a little more detail.

User needs

The demands for services made on an information department are not as well defined as some information staff pretend. It is rather fashionable to talk with great reverence of 'user needs', yet few individual users have any clear idea of what they want. Most are only too eager to know what services are possible, to give them a trial and to assess their worth. This has lead to much confusion between real user needs and imagined benefits from services that appear to suit customers. A further confusion can arise in attempting to transfer a service which satisfactorily meets the needs of one user to cover the requirements of another, and yet this must often be done to some degree in this world of economic reality.

At Aldermaston the overall current awareness needs are the sum of those of a sizeable research and development staff with a surprisingly wide range of subject interests, some changing with great rapidity. The staff is made up of many different professional levels and is distributed over a fairly wide geographical area. In fact, the user needs have about all the possible customer variables. AWRE is an R & D establishment organized as a number of Divisions, each with a specific subject discipline (e.g. applied physics, chemical engineering), contributing to overall projects as appropriate to their discipline. A service suitable to such conditions would not necessarily suit those of a more closely knit community or one with a narrower overall field of interest.

Information facilities

The facilities available to the librarian to meet the user needs are basically staff and money. Either of these in unlimited amounts would certainly reduce the problems, but because real life situations impose limitations, and these days they are pretty severe ones, each has to be used as economically as possible. At Aldermaston the information staff is small in number; the ratio of information staff to user served has not changed from that given by Corbett as approximately 1 : 200.[1]

Whitehall's paper[2] lists, in a very thorough way, the principal current awareness systems being used by a wide section of the information services in this country. At risk of over-simplification they may be regarded essentially as:

(a) The circulation to users of the current literature itself, either on a routine basis or individually selected by the information staff on known customer interest. This is perhaps the extreme in do-it-yourself service and although economic of information staff is expensive in periodical subscriptions and of course in users' effort.

(b) The use of externally produced and published services that more or less fit the interest fields of the users. In this category one should include information bulletins compiled by similar, or near similar, organizations, the regular circulation of appropriate current awareness journals or current contents lists and the more comprehensive abstracts journals.

(c) The use of customer profiles with one or more external tape searching SDI services.

(d) Use of individual and group profiles for searching one or more tape data bases within the organization.

(e) In-house production of an information bulletin or bulletins tailored to the users' interests and compiled in the main by manually scanning a set of 'core' or high yield journals.

Clearly these basic methods are not directly comparable, and no one of them is in itself entirely sufficient, although it is likely that with a large information staff and very generous periodicals subscription fund the internal journal scanning and bulletin compilation is very near to the ideal. Unfortunately few organizations are able to approach this state and so resort to a combination of these basic systems in varying proportions.

At Aldermaston we certainly circulate current periodicals. By careful selection of 'core' journals, many users are provided, not just with references to articles of interest, but with the literature itself. At least for some this service is about the most rapid possible, but there are very many snags to journal circulation, as all librarians will know.

Externally-produced current awareness lists are also used whenever appropriate, and where the users are willing to devote greater effort to scanning. Clearly the fortnightly task of looking through *Nuclear Science Abstracts*, or even selected sections of it, is not one lightly undertaken; nevertheless some users prefer the wide coverage of such services. *Current Papers in Physics* and *Current Contents* are used extensively, and in some cases bulletins covering more specialized subject fields are used. The *Information Bulletin* compiled by the Harwell Information Section is distributed widely within AWRE.

Where smaller groups of user profiles or individual interests extend beyond the subject scope of the tape data bases scanned internally, arrangements have been made to place these profiles with outside SDI services using more appropriate data bases. Some examples of such isolated interest fields at Aldermaston arise from diversification activities that fall within the life sciences and these are not covered by the tapes at present used for in-house SDI searching.

The preparation of tailor-made current awareness bulletins at Aldermaston has always been directly related to the information staff capacity. Some years ago we were able to compile five weekly-bulletins covering the major subject disciplines of the Establishment. Unfortunately the effort required to maintain this service is no longer available and the bulletins have dwindled to one (covering the specialized engineering interests of AWRE). On the other hand, the library has had the added commitment of providing the journal scanning services for the *Mass Spectrometry Bulletin* produced by the Mass Spectrometry Data Centre based at Aldermaston. Thus the shortage of information staff has led to the increasing adoption of in-house data base scanning to maintain an acceptable current awareness service.

Internal Tape-search Services

At present three data base tapes are searched regularly against users' interest 'profiles'. They are *Chemical Titles* tapes (*CT*), which have been used to provide a chemical literature current awareness service for the past six years: INSPEC, which has been searched regularly for about two years and *Nuclear Science Abstracts* titles tapes (*NSA*) for about the same time. Search is made in all cases for selected words or word roots in the titles of the references, and in a limited number of search questions for authors or for journal titles. With both *NSA* and INSPEC some searches also include the subject categories on the tapes.

Simple Boolean logic is used to give any degree of *and, or* and *not* combinations. The *not* facility is employed with effect where scanning is used as a 'back up' for the thorough manual scanning of set 'core' journals, as is the case in compiling the *Mass Spectrometry Bulletin*.[5]

The SDI services are in process of extension by searching the tapes of the contents of the fortnightly *US Government Reports Announcements* (*USGRA*).

Difficulties, however, are being experienced in the reformatting of these for use with the search programme at present in use. Unfortunately our somewhat limited programming effort has had to be diverted to other urgent needs, in particular that of programming to reformat the *CT* tapes in readiness to continue the service after their expected format change. Report literature is of very considerable importance to the R & D staff at AWRE and inclusion of the *USGRA* tapes in our SDI service is regarded as a high priority.

User evaluation

Print-out from the searches is made in duplicate using NCR paper; both copies are sent to the customer, who is asked to return one copy marked to indicate references that he (a) considers relevant to his interests and (b) wishes to borrow from the library. Although 'relevance' here is not capable of very strict definition, and is open to a variety of interpretations, it is the indication of a successful 'hit' as assessed by the user. Corbett has given some results of 'second response' assessments, these being confirmations or otherwise of the relevance category after seeing the full text of the literature[2]. Analysis of more recent user returns have shown no significant change of pattern. An indication of the desire to borrow the literature cannot necessarily be taken as a measure of high relevance as some references of greater value are followed up by personal visits to the library shelves, while interest in reading an article might also be independent of its relevance to the profile concerned. The system is purely a working arrangement that has been found to be effective, particularly in ensuring feedback to the information staff vital in monitoring profiles and adjusting them to give maximum extraction of useful references.

System evaluation

User statistics and operating costs have been analysed for the year July 1971 to June 1972, and the results compared with those obtained two years ago. A summary of the use being made of the services is given in Table 1. It will be seen that the numbers of profiles have increased in all cases, but it should be remembered that profiles in many cases refer to research teams, so that the total numbers of users of the services is considerably greater.

An analysis of costs for the same period is given in Table 2. Here the overall

TABLE 1: *AWRE internal SDI tape services use during year July* 1971–*June* 1972

	CT	*INSPEC*	*NSA*
Number of profiles	86 (70)	57 (46)	46 (43)
Number of questions	229 (230)	151 (125)	116 (120)
Number of search words	3,233 (2,800)	2,254 (1,700)	2,088 (2,100)
Average number of references per run	3,350 (3,200)	1,600 (1,000)	825 (700)

Note: Figures in parentheses are corresponding values for 1969/70. (See ref. 3.)

TABLE 2: *AWRE internal SDI tape services cost during year July* 1971–*June* 1972

	CT	*INSPEC*	*NSA*
Overall cost	£2,956 (2,160)	£3,498 (3,000)	£498 (480)
Average cost per profile	£34.3 (30)	£61.3 (65)	£10.8 (11)
Average cost per question	£12.9 (9)	£23.2 (25)	£4.3 (4)
Average cost per search word	£0.89 (0.75)	£1.55 (1.75)	£0.23 (0.225)
Average cost per reference	3.5p (4)	8.5p (12)	3p (3)

Note: Figures in parentheses are corresponding values for 1969/70. (See ref. 3.)

costs include the annual tape subscriptions together with the computer search and print-out costs. Comparing these with corresponding figures for the year 1969/70 it is seen that in all cases there has been some increase in overall costs. This is accounted for mainly by increased machine costs since the tape subscription charges have not gone up appreciably. The *NSA* tapes are received free of charge from the USAEC.

The picture for both *CT* and INSPEC shows some increase in the number of profiles searched (23 per cent *CT* and 24 per cent INSPEC), resulting in an increase with average output of references per run (47 per cent *CT* and 60 per cent INSPEC), and although the overall costs have gone up (37 per cent *CT* and 17 per cent INSPEC) there has been a decrease in the cost per reference (25 per cent *CT* and 29 per cent INSPEC). Clearly there is a limit to the number of useful profiles that can originate from within a research establishment, but it is doubtful whether we have yet reached the maximum. We certainly have not reached the optimum of profiles to give the most economic output.

A careful study of the three data bases in use at Aldermaston is being made by Mr G. Walker. He has already carried out an initial survey from the print-outs marked and returned by the users to determine for each data base the pattern of journal titles containing references relevant to different subject interests. This has been extended to study the coverage and overlap of the journals between the data bases in relation to the overall interest of the Establishment. The project is preliminary to experiments to merge the tapes before search runs in order to save machine time. Some interesting results have already emerged and will be the subject of a paper to be published later this year.

So far I have not mentioned the other data base tapes received and processed regularly at Aldermaston. By rights these should be regarded as the most important of all the current awareness tapes since they are of equal interest to all types of library. I mean of course the BNB/MARC tapes. We are using these, not only as a source medium for cataloguing data on AMCOS (Aldermaston Mechanized Ordering and Cataloguing System) but also as an announcement source of the published material for purchase for the library. Very briefly this is done by running the tapes against the broad subject interest of the Establishment defined by the appropriate Dewey Classifications. References likely to be of interest are extracted and printed out in full and at the same time stored on a 'potential requirements file' (PRF). Orders are made by calling up the SBN concerned via an on-line terminal and indicating certain purchasing details such as the number of copies required. From the PRF all data necessary to identify the literature is extracted and entered onto pre-printed order forms. When the publication is supplied by the book-seller the appropriate record is transferred from the PRF to the main catalogue file. Local cataloguing details are added again via the on-line terminal. Records in the main file are cumulated and printed out at intervals to provide the library catalogue. Details of this integrated library system will be found in a recent article in *Program*.[6]

Present development is in the use of COM in order to accumulate the catalogue more frequently at an economic cost. Sample sections of the catalogue have been made on 16 mm film and we are now awaiting a suitable COM reader.

Unfortunately the currency of references in BNB tapes is disappointing, so that the volume of new literature ordered from tapes is running at between 25 per cent to 30 per cent of the total. A higher proportion of the catalogue entries is used, but this entails delays in the records appearing in the library catalogue. We are just eagerly waiting for improvements in the BNB tapes.

REFERENCES

1 CORBETT, L. Using commercially available literature tapes for a current awareness service. *The Information Scientist*, **2**, 3, Nov. 1968, p. 88–102.

2 CORBETT, L. Progress at AWRE in development of mechanized current awareness services. *Program*, **4**, 4, Oct. 1970, p. 141–9.

3 CORBETT, L. Problems in using external information services—attitudes of the special library and its users. *Aslib Proc.*, **24**, 2, Feb. 1972, p. 96–110.

4 WHITEHALL, T. 'A future for the Bulletin?—the results of an enquiry into how bulletins are used in today's special library.' Paper presented at the Aslib Electronics Group, 14th Conference, 6–18 June 1972. Unpublished.

5 SEARLE, R. H. Human v. machine selection for current awareness in mass spectrometry. *J. Doc.*, **26**, 3, Sept. 1970, p. 221–9.

6 CORBETT, L. *and* GERMAN, JANICE. AMCOS project stage 2. A computer-aided integrated system using BNB MARC literature tapes. *Program*, **6**, 1, Jan. 1972, p. 1–35.

DISCUSSION

DR G. SOMERFIELD (Commonwealth Agricultural Bureaux) said that increasing effort had been made by Harwell Information Group during 1968–72 to provide input to INIS. He wondered therefore whether the output (presumably INIS tapes) would be cost effective for both Harwell Information Group and the United Kingdom, since most of the UK use would be by the Atomic Energy Authority.

MR TERRY said that MR SOMERFIELD had raised an important question. At present, *NSA* tapes were being used at Harwell, but not the INIS tapes. INIS output was probably of more use to the developing countries than to the UK for whom, at this stage, the INIS operation was certainly not cost-effective.

MR A. E. CAWKELL (Institute for Scientific Information) said that MR FRIEND was the first speaker so far to mention the need to include the user as part of the system. He believed that for cost-effectiveness studies, the user's time should be included. H. Dammers had drawn particular attention to this (*Inform. Stor. Retr.* 6, 1970, p. 17). For example, one should compare the time spent by a user in reading, say, twenty-five 250-word abstracts per week and the time spent in reading twenty-five 14-word titles. Dammers had stated, when discussing certain types of computer systems, that only after inclusion of the user costs can decisive cost advantage over the manual approach be demonstrated.

Mr Friend's statement of the costs of his own service emphasized the need for the great care necessary when interpreting such costs. For example, at Unilever, D. G. Rowlands (*Inform. Stor. Retr.* 6, 1970, p. 53) gives an 'all costs' figure of £20,000 per annum for operating ISI tapes. However at the time the cost per hit was only 7p and has since probably decreased, because of the very large numbers of users being serviced.

MR C. G. GILES (DTI) said that MR FRIEND had spoken of the value of research reports as an information source and of the problems of merging *USGRA* tapes with other material. The problem with research reports was that they were essentially 'unpublished' with a small circulation and came from many sources. The Technology Reports Centre of the Department of Trade and Industry was concerned with providing an information service on the reports to government users and increasingly to industry. The main announcement journal was *R & D Abstracts*. Some time ago it was decided to replace our card index of reports by computer-produced indexes. At first they had been annual or semi-annual indexes but there was now a computer-produced index in each fortnightly issue of *R & D Abstracts* with separately produced cumulative indexes every quarter. The aim now was to build up a comprehensive listing of R & D reports from UK and other countries from retrospective searching by computer. One step had been the merging of the *USGRA* tapes with the UK produced tape. This was now being done very successfully using, incidently, U.K. 'hardware' etc. in the process. A merged tape was being produced every fortnight from which was being run an SDI service of 200 profiles, together with 20 'Topics' listings covering areas of wider interest. At present, in what was regarded as the 'experimental' phase, these services were being provided to government users only. As the next step, the search technique is being improved to handle 800 profiles in the same computer time prior to launching these services on a wider basis to industry.

MRS E. MARSH (Rutherford Laboratory) asked what differences would result if the American Institute of Physics took over *NSA*.

MR TERRY replied that he could not give much information on this point, because he was waiting for news himself. He said, however, that *NSA* was being put onto a commercial basis and that it had been suggested that the price would increase by a factor of seven, in which case the INIS service might become more important.

MR R. BEER (BP Chemicals) asked whether commercial information services and UKAEA were only going to supply titles of articles and abstracts for an SDI service. New publications contained much more data on chemical and physical properties,' statistics, spectra, trade names, etc. He asked what UKAEA did during visual scanning to store such material, and what commercial services did to supply such information.

MR TERRY reminded MR BEER that he had said in his paper that they had found that they had to maintain visual scanning of the literature, both for notification and recording. There were also specialized data services covering chemical and physical properties.

MR T. M. AITCHISON (INSPEC) said that, although AWRE do not use the facilities because of program constraints, INSPEC tapes offer provision for searching on controlled-language subject headings, a hierarchical classification and free language index strings, as well as treatment codes.

MR FRIEND said that perhaps he had not made it clear that at Aldermaston they could if they wished search on journal titles and authors' names.

MISS H. TOWNLEY (IR Advisory Services) asked MR TERRY how much notice he had received, and to what extent were his opinions sought, before the changes in *NSA* tapes were implemented.

MR TERRY replied that UKAEA has been consulted on the proposed changes to the INIS thesaurus used by *NSA* but that their advice that changes be kept to a minimum had not been followed; for the *NSA* tapes, it had to be recognized that this was a service designed to meet US needs and there was no obligation to give notice to other users. For the method of searching which had been chosen, there was insufficient time to make the changes necessary to maintain a service.

MISS TOWNLEY also asked whether the cost of re-writing profiles and writing new programs to meet the changes in the tapes could be given. Such information was often lacking in reports on working systems. MR TERRY replied that the operation was still in progress, so final figures were not yet known, but he undertook to provide any information that was available before publication. [MR TERRY has since written to the Editor pointing out that experience to date showed that altering profiles when a radically revised thesaurus was introduced took almost as much time as writing the original profiles. Almost two man-months programming effort had been required to meet the change in the content of the tapes (particularly the removal of code numbers for indexing terms) in order to maintain a service until a completely new method of searching could be introduced.]

MR B. STERN (Wellcome Foundation) said that, by contrast, some commercial tape services were prepared to accept a contractual obligation of giving a minimum of three months' notice of change and this did not include discussion. Therefore a 'lead in time' of up to a year was feasible.

MR A. C. CLARE (Guest, Keen and Nettlefolds) asked the speakers to say something of the extra loads on the back-up services (provision of documents) following the adoption of an external data base?

MR FRIEND had said that a large increase (100 per cent) of external borrowings had ensued, and problems occurred involving late appearance of periodical articles and reports after an early appearance in *CT*.

MR TERRY said that in the main NLL had provided the answer, but there had been a problem with US reports on microfiche because the tapes were received and notifications sent out before the copies of the reports arrived.

MR FRIEND agreed with Mr Terry's answer and added that their loans had increased by 100 per cent and that this was a good example of the way in which outside services could be affected.

External services in retrospective searching

F. Robinson

Corporate Information Unit, ICI Ltd,
Millbank, London SW1

Paper presented at the 46th Aslib Annual Conference, University of Sheffield, 24th–27th September 1972

Introduction

FOR THIS PAPER external services are defined as intermediaries between the original publication and its subsequent retrieval in response to an enquiry. Thus they include periodic indexes produced by publishers, abstract journals, indexes (or abstracts) sold in computer-readable form, and organizations offering search services who may, themselves, use any of the foregoing.

There is, of course, a preponderance of manual services, but much interest is now concentrated on services offering magnetic tapes or computer services. So far, these services have tended to be used mainly for SDI or current-awareness, but in so far as the 'information explosion' makes some form of machine assistance important, this help must be available for retrospective searching.

The purpose of the paper is to discuss the problems involved in using external services for retrospective searches. There is no attempt to set down a definitive solution (for none exists), but possible methods are described, each of which is appropriate to particular circumstances.

Summary of approach to external services

There are two basic ways of using external services; the first is to go out to a service organization to buy answers, and the second is to buy in material which will enable your own staff to find the answers. The bought-in material may consist of hard copy indexes, microfilms, cards of various types, or machine-readable forms (usually magnetic tapes). A third, intermediate, method is to obtain access to an external store of relevant material. Traditionally these 'stores' have been the great libraries; in the future computer-stored data banks with terminal access will grow in use.

The alternative to the use of external services is, of course, a wholly internal operation, and the cost and effectiveness of such an operation must be the standard against which all others are compared.

The starting point for any search is, obviously, the definition of the enquiry. In an oblique way the form of the service affects this, as limitations in the coverage will eventually be reflected in the type of questions asked and the restrictions imposed on an internal system by economics or on an external one by the problems of communication of ideas may have this effect.

The mixed solution

It is easy, but unrealistic, to assume a straighforward choice between the internal and external approaches. It is unlikely, however, that an external service can be used alone as there will always be information from internal sources which must also be searched. The need for prompt coverage of some fundamental journals will often mean that these, too, are handled internally for current-awareness and the references then stored for search. It will, therefore, be necessary to use both internal and external systems for search purposes.

The mixed solution brings up two points; the first is the question as to whether it is necessary to have subject separation for search purposes; should, for instance, the internally-generated material be stored and searched separately? In general, given adequate capacity, it must be better to have common storage and searching, but the system must permit quick identification of the different types.

The other point is the need to define the rules regarding the selection and searching of material to avoid continual enquiry on how particular items are dealt with. This is a problem which should not arise with wholly internal systems but which may occur when external services are being used in addition to external sources.

Use of external service organizations

The use of external service organizations requires, first of all, an evaluation of the service needed and available. The earlier paper by Mr Vickery[1] has discussed this in detail. It would seem that the external organization is good for marginal interests and for major interests when the cost of maintaining an adequate file internally is prohibitive. Lack of information on the search services may restrict their use; the Aslib Information Department are always willing to advise on available services. The *Aslib Directory*, the US *Encyclopaedia of information systems and services*[2] and *A Guide to selected computer-based information services*[3] are other potentially useful sources.

In using external organizations there must be reliance on their technical expertise; the final judgement on the quality of the service must be based on the answers provided. The user is not concerned whether the organization uses computers, hard-copy indexes or ouija boards so long as the answers are prompt and reliable.

It is in relation to the use of such organizations as a back-up on marginal interests that the setting down of procedures for their use are most important. Using service organizations may be cost beneficial but the benefits will be lost if some of the questions are answered internally.

Apart from the entrepreneurial aspect of their work, these organizations have the same system problems as anyone else. They are more aware than most of the cost of their operations and must be conscious of the dangers of over-sophistication if they are to succeed.

Services used internally

The most widely used of the services which are bought for internal use are the printed indexes and abstracts journals. These are not dealt with in depth here because their use does not generally affect the organization of the information unit. In some cases these indexes are issued in printed or printed/punched-card format which simplifies their use for searching at the cost of filing (and possibly mis-filing).

Another variant is the microfilm index which may be produced in a cumulative form—reducing the filing problem. The use of microforms is growing and novel ways of retrieving items stored in this way are being developed. There are two problems in using a microform rather than a printed index. The first is the cost of microfilm readers and their location. Sending a book through the post is immediately effective if the recipient can read, but a sheet of microfiche is only usable if there is a reading device available. Therefore the expense rises if there are several locations sufficiently distant from the information store to inhibit travel to it.

The second problem is the reluctance which many people have towards the use of microfilm readers. Experience and improved design may diminish this but it still seems to be a barrier towards extension of the use of microfilm generally.

Computer-readable services

While dependence on hard-copy or microfilm indexes will affect the organization of the information service, this is small when compared with the effect of introducing computer-readable indexes. The use of all 'humanly readable' indexes tends to be the same and is a basic skill of information handling. When a computer is introduced these basic skills are still necessary but this is often forgotten in the novelty of the machine. The main purpose of buying information in magnetic tape form is to exploit it by these skills. The mechanisms or systems by which the skills are applied will vary, but they must be used if full advantage is to be taken of the information.

The main criteria in the use of tape services is their availability in the subjects of interest to the firm. The coverage of the services is widening but there are still many wide gaps. These tend to be in the relatively small, specialized subject areas. The increasing availability of suitable programs and the obvious success of other organizations in producing computer-readable data bases is leading to growth in coverage.

It should be remembered that the specialized journal has no more direct access to computer knowledge than the small user firm. The costing and pricing for a computer data base is very different from that for a printed journal and I believe that there is a need for an organization to help these smaller indexing agencies by providing computing facilities for the creation of tapes, and by testing the market for the products. For such an organization the costs for each item input should be low and a link with computer typesetting could easily be provided.

In virtually every case the magnetic tape as purchased must be processed in some way before it can be used for search. The tapes are often primarily intended for SDI use and are issued periodically. Each tape will cover only the most recent period and must be combined with the older issues before it is readily usable for search.

The need for pre-processing is emphasized if tapes are received from several suppliers to be used in a common search system. The possible need to include other material, whether internal reports or items internally selected from the literature, increases the size of the problem.

The difficulty arises principally from the fact that no standard for the format of these tapes has been implemented. Thus tapes from different suppliers must each be initially processed by a special program which takes account of its particular idiosyncrasies. ISO and the two organizations of tape service operators, ASIDIC and EUSIDIC (respectively the American and European Associations of Scientific Information Dissemination Centres), have drawn up proposals for standard interchange formats, the adoption of which would considerably improve this particular aspect. There is little evidence that these will be adopted in the near future. It is particularly important for the suppliers of the small data bases to adopt some standard, as this should encourage use of their files, whereas the major suppliers can be more independent.

These formats are all intended for data transfer and are designed to allow maximum flexibility of field contents and location. This flexibility is achieved by the use of the MARC-type or directory organization of the file contents, which is not necessarily the best layout for searching where the number of records which need to be scanned makes efficiency important. Thus, even if interchange formats are standardized there may be an advantage in processing the tapes into a good form for searching.

The use of external data bases for search is affected by the information content of the tapes. Some give title, author and bibliographic details only for the items covered; others add manually assigned keywords, while a few include abstracts. Obviously, the effectiveness of the tape for searching depends on the quality of the descriptions applied to each item. It is unlikely that titles and authors will be a good basis for search in all circumstances, but potential users must consider their needs and general approach in order to decide what is a satisfactory information level for them. If this level is not reached in the services available in relevant subjects, then pressure on the suppliers, preferably in conjunction with others, is the best approach.

The two other main factors in considering an internal service from purchased tapes are cost and size. The main saving from using externally-produced indexes is in reducing manual index preparation and the cost of each item on tape is relevant. The *Survey of scientific-technical tape services*[4] quotes the number of items and total cost. The unit costs calculated from these figures range from 0.4p to 20p per item. The range for data bases with under 50,000 items/year is 1.6p to 20p, for 50–100,000 items/year from 0.4p to 7.8p and for those over 100,000 items/year 0.6p to 2.5p. The provision of abstracts tends to increase the unit cost, but this does not apply so strongly with the smaller data bases. Obviously, these costs are cheaper than can be obtained internally, but the figures must be amended to take account of the percentage of potentially relevant items on each tape; e.g. few organizations need the entirety of *Chemical Abstracts*. The cost of processing the tapes is, of course, additional to the subscription; calculation of the cost benefits of using external data bases is discussed later.

The number of items provided from a service governs the question of its use internally for retrospective search. The computer capacity and programs available determine the size of data bases which can be handled. A different approach is needed for small as opposed to large search files and the two are discussed separately with small being defined as under 50,000 items/year. Most computer systems (hardware and software) should be able to cope with volumes below this level; greater volumes begin to cause storage problems.

A small data base can be achieved either by purchase of low volume tapes or by selection from one or more of the large-volume services. The idea of selection is useful but there are difficulties in deciding the basis. A popular scheme is to store for search the relevant items retrieved by SDI profiles. This is easy to achieve but has the disadvantage that many, possibly most, of the searches will not be on the subjects covered by profiles.

One alternative is to take all items from specified journals, while another is progressively to build up a broad subject profile. Selection by sections or classifications is also potentially useful where these are provided. In all cases there will be some material which is not relevant and the proportion of this will decide the value of the approach.

The product of any broad profile can be improved by screening, rejecting irrelevant items before creating the search file. A variation of this is to add information to the items being retained to emphasize aspects relevant to the users. It is theoretically possible to screen output from the broad profiles automatically by comparing the keywords with a thesaurus reflecting the users' interests. Weighting the terms enables a threshold to be set, thereby eliminating items matching on relatively unimportant concepts.

The items thus obtained (i.e. by purchase and/or selection) can be searched in one of two ways. The simplest of these is to create manual indexes (either on card or in 'print-out') which should have advantages over those publicly available, depending on the extent of internal selection and merging that has taken place.

The second method is to incorporate the data into a computer search file. This will include merging with previous items and may be used to create either a serial or an inverted file. The choice between these two methods is dependent on the ratio of input costs to the number of searches and has often been discussed. Searches will be done in batches, possibly overnight, and may use varying types of logic. This too, has been discussed elsewhere.

There are computer packages readily available which will handle the input and provide a search capability. The ASSASSIN package,[5] which is used throughout ICI, had as one of its design parameters the acceptance of differing data formats, and several data bases have now been successfully fed into ASSASSIN systems. This system gives manual search tools and a computer search using an inverted file with powers of 2 weighting.

Large data bases

The problems of searching large data bases are partly due to the computer storage facilities needed and partly to the problems of term or word organization. In general, computer-produced manual indexes for very large files are unsatisfactory, although ICI has had some success with a cumulative version (on microfilm) of the Keyword Phrases ('Pink Pages') subject index to *Chemical Abstracts*.[6]

Computer search of these large files depends on the availability of large, cheap storage and on the number of searches to be run which must be fairly substantial—probably not less than 500/year. The justification for such a system should state the expected number of searches which would take more than half a day to perform manually. The introduction of a 100m. byte disk store by IBM improves the prospect of viable search systems and, if past experience is any guide, further advances are certain. The time needed to search a large serial file suggests that an inverted system is better for the very large data bases. However, the creation of inverted files is expensive and the problem of term organization which is necessary for inversion adds to the difficulties. It is clearly important that the searcher has knowledge of the terms used in the file. This is difficult with uncontrolled input; collections of terms from the major data bases have been published and these can help in the initial organization of the file. However, new terms will arise frequently and some method of actioning these is needed. Computer handling of new terms is restricted, in practical terms, to acceptance of all new occurrences which may include spelling variations and synonyms of existing terms. Some intellectual effort is essential if the terms are to be readily usable at search time.

Computer programs have been written to search these large tapes. The IFI US Patents tape has been searched in ICI for several years using an inverted file with a weighted search[7] at a reasonable cost. This file contains entries for over 200,000 patents but each record is fairly small. The United Kingdom Chemical Information Service (UKCIS) has written a suite of programs (INFIRS)[8] for the creation and searching of an inverted file to be used primarily for the *Chemical Abstracts* tape services, which will soon be implemented.

Nevertheless, such large files will always be costly to create and search, and it is unlikely that many organizations will be able to justify the expenditure. There is clearly a case for co-operation among potential users, and a group of EUSIDIC members are discussing the establishment of a joint terminal to ESRO/ELDO to access these files for SDI and search.

On-line searching

Some consideration of on-line computer searching is necessary in view of the number of schemes currently being described and discussed. On-line systems are expensive in that they require storage devices (usually the more expensive direct access peripherals) allocated to them for long periods and some part of the main store of the machine must also be dedicated to the system. The total cost will obviously depend on the size of the data bases, but must always be considerably greater than an equal-sized batch system. Justification of this expense requires either heavy usage or a continuing high degree of urgency. One method of reducing the high cost is to bring the files on-line for a short period each day, but this loses the great advantage of on-line systems which is that answers are produced when needed rather than at some indeterminate future time.

An associated cost is that of terminals to access the on-line files, but these are best considered as an alternative input device for either enquiries or internally-generated information, and may be justified for that alone. One approach is to develop the enquiry logic by use of an on-line thesaurus as the question is input to the computer via a terminal for later searching in a batch. Terminals are available which will also store computer output (e.g. the answers) in magnetic tape form for later screening and printing.

The disadvantage with all batch searching is that the searcher must switch to some other problem, once the input cycle has been completed. Receipt of the computer output (by post or terminal) requires redirection of thought to the problem. This is mentally jarring and time-wasting, but is one of the reasons why the introduction of computer systems usually means reorganization of the work of the enquiry centre. If searches are to be batched for machine running, then procedures are needed to have the searches ready together and to arrange for the output to be distributed quickly when it is available. This is very different from the usual organization of an information unit.

Furthermore, the method of defining the question must match the computer system's requirements and this requires a different kind of precision from that usually practised by information people. And through all this the basic skills of the experienced searcher must be retained or the baby will have gone out with the bathwater. A maxim that has been repeated many times is 'the system must be designed for the people and not vice versa'; this is true but may obscure the need to rethink the procedures to get the best out of both people and system.

Cost/benefit

There is nowadays a valuable emphasis on the need to justify change by cost/benefit analysis in some form. There can be no argument about the need for this, but a problem arises with the introduction of services in a new form. In computer-based information systems there is usually a different level of service for a different level of cost; not necessarily better or worse, but different. Assessing the benefits in these circumstances is not easy while the costs may be discouraging. The costs of many systems have been affected by the cost of continuing development. Reported costs in these cases are discouraging, but systems are now available which are fully developed and give good results for reasonable costs. These are easily implemented and are suitable for the small or medium user. An ICI example is of an information unit which decided to implement ASSASSIN for its SDI/search operations. Within three months of the decision the system was working and three months later it was in full, relatively smooth, operation, with costs near to estimates.

This digression is intended to encourage people to take a close look at the use of external services generally, and computerized ones in particular. This close look must include costs of all parts of the proposed operation and should include the following:

Cost of service:
Subscription plus any additional servicing charges.

Cost of processing:
File creation, searching and any special work should be included. The processing may be either manual or by computer.

Cost of system maintenance:

In a computer operation some cost is normally incurred for program maintenance, i.e. making sure that they keep running.

Cost of additional time preparing searches.

Cost of programs:

Whether written specially or purchased. This should be calculated as a cost over expected period of use, even if the cost is borne by some other part of the organization.

The benefits are harder to evaluate. There are some direct savings, mainly reduced time spent in selecting, indexing and clerical handling. There will be others, such as wider coverage of the literature, quicker response to major enquiries and reduced storage space, which are harder to identify and harder to evaluate.

It is difficult to be objective in this evaluation, but the importance of getting the best answer makes objectivity essential. In particular, it is well worthwhile checking all potential benefits as this might well show additional uses which were not seen previously.

A costing complication arises when an external service is used for SDI as well as for building a search file. In this circumstance the costs related directly to one or other service should be noted and the others split over the headings on some sensible basis. The difficulty of the sum should not obscure the fact that a joint operation of this type gives very good costs for both services.

Some guide figures might be useful to indicate the order of magnitude of costs of a computer search system using an external data base:

25,000 items/year; updated annually; 300 searches/year.

	Annual Cost
Service subscription	£2,500
File update	400
System maintenance	250
Searches	1,200
	£4,350 = £14/search

Note that the unit cost is very dependent on the level of usage; with 400 searches the total cost is £4,650 and unit cost is £11.

Summary

The use of external services in general will increase as the volume of information and pressure on costs increase. This will apply to SDI and search uses of computer and non-computer services. The problems of processing the large volume computer-based services will lessen as the capacity of peripheral storage devices increases and the cost decreases. Use of externally stored data bases may become more common, particularly for large volume services. The subject coverage of computer-based services can be expected to increase. The systems currently available to process low-volume data bases offer effective and economic operation.

REFERENCES

1 VICKERY, B. C. External sources of information: The kinds of service and facilities offered, criteria for evaluation: See this issue, p. 664.

2 KRUZAS, ANTHONY T. *Encyclopaedia of information systems and services*: 1st edition. Michigan: Edward Brothers, 1971.

3 FINER, R. *comp. A Guide to selected computer-based information services*. London: Aslib, 1972.

4 CARROLL, K. D. *Survey of scientific technical tape services*. American Institute of Physics, American Society for Information Science, September 1970.

5 CLOUGH, C. R. *and* BRAMWELL, K. M. A single computer-based system for both Current Awareness and Retrospective Search: operating experience with ASSASSIN. *J. Chem. Doc.*, 27, 4, Dec. 1971.

6 ROBINSON, F. A microfilm index to Chemical Abstracts. *J. Chem. Doc*. In press.

7 MATTHEWS, F. W. Weighted term search—a strategy for searching a large file by computer for document retrieval. *Proceedings of the American Society for Information Science*, 7, 1970, p. 315.

8 KENT, A. K. The UKCIS Inverted File Information Retrieval System—INFIRS. 30th July 1970. Unpublished.

DISCUSSION

MR K. J. HODGES (Australia House) asked whether it was true that, in order to repay the cost of going over to an inverted file, one would need to be running 700–800 searches per year?

MR ROBINSON replied that the break-even point would be somewhat less than 700 searches but would ultimately be dependent on the number of searches carried out, related to the total system.

MR C. G. GILES (Department of Trade and Industry) said that MR ROBINSON had spoken of some experience with microfiche readers. One could now get quite good portable readers for £50–£60, which was roughly the cost of a typewriter. Would he regard this as expensive, particularly in view of the great ease of copying, storing and circulating microfiche as compared with hard copy?

On the cost of storage by computer, Dr Anderla had recently made a study for OECD which pointed to at least a one-hundredfold reduction in costs in a reasonably short space of time.

MR GILES then said that with regard to service costs, the Technology Reports Centre of the Department of Trade and Industry provided a UK entry point into the 'Recon' service operated by ESRO/ELDO. One of the major cost items was that of lines from UK to Darmstadt where the computer is based. There has been some technical troubles with the system but he estimated that they now had capacity for about 3,000 retrospective searches per year and the service was available to industry. The system was such that their present lines could service additional terminals as well. This would be one way of reducing the impact of line costs. The main problem was whether the demand was likely to grow to justify a greater number of terminals in the UK. Present indications were that a terminal speeded up the work of making searches by a factor of three and certainly our information scientists were now satisfied that with the experience they had gained, the terminal enabled them to produce a better search result than was possible previously, using card and printed indexes to the material. In principle the TRC would be happy for people to have trial use of their services: the problem for them was to know what amount of trial use was necessary for a fair and reasonable evaluation of the services to be made.

MR ROBINSON agreed that one could get microfiche readers for £50–£60, but this was still an *extra* cost. Concerning the second point, it was certainly only fair to say that retrieval costs would eventually come down. With regard to use of on-line terminals in this country, *Euridic* were proceeding with a co-operative venture for on-line services, which was proving a satisfactory start in this direction.

MR A. E. CAWKELL (Institute for Scientific Information) said that it seemed possible to extend Mr Robinson's curve, showing cost per item stored on tape, to very large files. For example, with ISI's Citation Tape, carrying about 4 million items per annum, the cost per item worked out at about 0.125p.

MR CAWKELL also challenged the remark that retrospective searches were always likely to be expensive and said he would risk a forecast about cost reduction in storage and searching. It seemed possible that compression techniques could reduce file size by a factor of 2, that techniques of bit-screening or clustering might reduce search times by a factor of 25 (a factor of 50 had already been achieved by bit-screening in the Index Chemicus Registry System tapes), and that a further advantage of about 10 times may be possible with the advent of holographic storage techniques. This added up to a total of 500 times. If such improvements came about in the next five years then the near future looked promising for on-line retrospective searching. It was in this field that inter-active information retrieval would be most beneficial, since at present, heavy penalty was paid if the search of a very large file was carried out using the wrong questions. A question/answer dialogue should enable a user to test the effectiveness of his questions by sampling and modifying, and to obtain a proportionately much larger benefit in retrospective searching than in a current awareness on-line inter-active service.

MR ROBINSON replied that he felt that retrospective searches would remain relatively expensive. The cost would undoubtedly come down and ISI had already shown that it was feasible, but by how much and how soon was still very much in question. It did not necessarily follow that on-line systems saved time, as one could still waste time addressing the terminal.

Letters to the Editor

Dear Sir,

KEYCODE DICTIONARY

Mr A. Pritchard of the NCC (October *Proceedings*) points out the advantages of using a sequential accession number to identify terms in a thesaurus so that these can be used to link versions of the thesaurus in different languages.

This is a step in the direction we took some years ago with our Keycode system. In this, the ideas represented by a term are coded and all synonymous terms (including foreign language equivalents) are coded in the same way. As we are dealing with ideas, it is possible to add or subtract codes to deal with terms for which precise translation is difficult.

Although the effectiveness of any multi-lingual system depends on the care with which the technical terms are translated, the principle is both simple and effective. A French version of the Keycode Dictionary is already available and work is in hand on German and Spanish editions.

The compilation of the Keycode Dictionary was described in *Aslib Proceedings*, Vol. 20, No. 3 (March 1968). Its form is that of an alphabetical dictionary of natural language terms, to each of which is attached a series of Keycodes or labels which identify the concepts represented by the term. The following are extracts from the English and French editions:

laboratory	REEM+SCUO+STAD
labour (personnel)	MINE
labour (work)	TISK
lacquer	FULM+MITT
lacquering	FULM+PREC
ladder	STIU
laboratoire	REEM+SCUO+STAD
laine de bois	BYPR+FERM+FUBR+MITT+ROFA+TUMB
laïque	MINE
lampe de tungstène	EPTU+LIMP
langues orientales	ERUO
aveur mécanique	BEDY+FIBR+HELD+HYGU+IPPL+PREC

It is apparent that, because the codes are independent of language, a document can be indexed using the English Keycode Dictionary and retrieved using the French edition, since the Keycode combinations represent the same concepts whatever language is used.

Yours faithfully,

MICHAEL ROSTRON

Hutton & Rostron,
42 Claremont Road,
Surbiton,
Surrey.
31st October 1972.

Dear Sir,

PUBLIC LENDING RIGHT

It is perhaps a little late in the day to make observations on your notes to the Paymaster General, reproduced in the October issue. However, I would like to remark on comments 4 and 5 (p. 547–8).

Comment 4

I feel that by raising the question of relationships, rather than definitions, the point you try to make is obscured.

An organization buys a book which it adds to its library stock. The book still remains the property of the parent organisation *not* the library. Now, if a servant of the organization, be he employee or consultant, uses the book in connection with the company's interests, the true beneficial use is to the organization—who own the book! The library no more lends the book to him than a secretary lends her boss a correspondence file from his own filing system. This must hold whether he reads the book in the organization's library, or in his office (or even on the train to work).

Comment 5

This definition of lending is almost word for word the Concise Oxford Dictionary's definition of borrowing. However, the important word is 'use'. One of the uses that a library makes of its stock is to grant temporary custodianship of it to others. Since the library is, we will presume for the moment, the owner, within this definition of lending, it appears arguable that libraries do not lend stock, and hence are not affected!

It seems to me that the whole argument for authors' levies arises out of cupidity and is supported by muddled thinking. Offhand I can think of no car manufacturer who makes it a condition of sale that his cars can only be used by the purchaser, nor offhand can I think of any other mass-produced product that has this restriction attached to its sale.

Yours faithfully,

K. J. ILLING

Librarian

British United Shoe Manufacturing Company Ltd,
PO Box 88,
Belgrave Road,
Leicester LE4 5BX.

14th November 1972.

CURRENT AWARENESS LIST

Recent additions to the Aslib library catalogue are broken down into twelve broad groups, whose coverage is indicated below. These groups are not mutually exclusive but it is hoped that users will find them helpful in scanning for new items of interest.

User Studies
Analyses of information-seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory.

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject Organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies; reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies; directories.

JANET WALKLEY
Librarian

CURRENT AWARENESS LIST

*Items are available in the Aslib Library and may be borrowed unless marked * to indicate reference copies.*

User Studies

DOVER, P. A.
Massey University Library user survey.
New Zealand Libraries, vol.35, no.3, June 1972, p.174–9.

MENZEL, H.
Unplanned acquisition of information in the experience of polymer chemists.
IEEE Transactions on Professional Communication, vol.PC–15, no.2, June 1972, p.39–42, 47–8.
Results of interviews with 161 chemists.

DANSEY, P.
Do information scientists read about information science?
Information Scientist, vol.6, no. 3, September 1972, p.107–10.
A survey of reading habits among participants in the 5th conference of the Institute of Information Scientists.

SWANSON, DON R.
Requirements study for future catalogues.
Library Quarterly, vol.42, no.3, July 1972, p.302–15.
Summarizes a lengthy research project on what information should be recorded in future library catalogues in order to best serve users.

MACLEAN, HILLAS
Using the library catalogue.
New Zealand Libraries, vol.85, no.3, June 1972, p.165–72.
A survey carried out among academic libraries in New Zealand.

DIMITROW, M.
Nutzerschulung: Weg zur optimalen Ausnutzung der wissenschaftlich - technischen Information als Mittel fur Steigerung der Produktivitat der geistig-schopferischen Arbeit.
Informatik, vol.19, no.2, 1972, p.48–50.
Education of users of information in East Germany.

Communication and Knowledge

ROBBINS, J. C.
Communications among scientists and engineers: a commentary.
IEEE Transactions on Professional Communications, vol.PC-15, no.2, June 1972, p.65–7.
Communication in the mass media.

BUDINGTON, WILLIAM S.
Venn diagramming the information community.
Illinois Libraries, vol.54, no.6, June 1972, p.460–5.
The contacts between information processors libraries and users, and the financial and access aspects of mutual support.

Information Processing Systems

SIMPSON, G. S.
Information analysis center viewpoint on wordage problems: amount, languages, and access.
Journal of Chemical Documentation, vol.12, no.2, May 1972, p.97–8.
The work of IAC's in synthesizing, analysing and compressing pertinent information.

STIEHL, WILFRED
Informationsversorgung fur die padagogische Wissenschaft.
Informatik, vol.19. no.3, 1972, p.17–24.
The provision of pedagogical information in the GDR-storage, retrieval and dissemination.

HANSEN, INGEBERG
Subject compatibility between Chemical Abstracts subject sections and search profiles used for computerized information retrieval.
Journal of Chemical Documentation, vol.12, no.2, May 1972, p.110–13.
Part of the evaluation of an SDI service.

HANSEN, INGEBERG
Evaluation of the database *CA Condensates* compared with *Chemical Titles*.
Journal of Chemical Documentation, vol.12, no.2, May 1972, p.101–10.
The performance of *CA Condensates* in an SDI system compared with that of *Chemical Titles*.

SEALY, T.
An effective use of microfilm in a technical information system.
Information Scientist, vol.6, no.3, September system using a feature card index and 1972, p 111–15.
The White Fish Authority's information microform storage.

Language and Indexing

FISHMAN, MARILYN
The transformational model of language and information retrieval.

Drexel Library Quarterly, vol.8, no.2, April 1972, p.193–200.

FREEDMAN, BARBARA
Thesauri for vocabulary control.
Drexel Library Quarterly, vol.8, no.2, April 1972, p.125–8.
The development of the thesaurus concept and methods of construction, etc.

WALLS, NINA
Thesauri and classification in non-scientific areas.
Drexel Library Quarterly, vol.8, no.2, April 1972, p.129–34.
Briefly discusses thesauri, and describes faceted classifications in education, the performing arts, social sciences and law and librarianship.

NEUFELD, MARGARET, L.
Linguistic approaches to the construction and use of thesauri: a review.
Drexel Library Quarterly, vol.8, no.2, April 1972, p.135–46.
The application of semantics and the theory of syntactic relations as applied to thesaurus construction.

DAVIES, MARION
Computerized visual indexes: a review.
Drexel Library Quarterly, vol.8, no.2, April 1972, p.173–9.
A survey of indexing techniques in the fine arts including a computerized method utilizing visual images.

NATIONAL LIBRARY OF MEDICINE (UNITED STATES)
MEDLARS indexing and searching aids.
Bethesda (Md.): the Library, 1972.
1v. (PB 207 175)

SEELY, BARBARA J.
Indexing depth and retrieval effectiveness.
Drexel Library Quarterly, vol.18, no.2, April 1972, p.201–8.

HUMBERT, KAREN
To be 'KWIC' or not be 'KWIC'.
Drexel Library Quarterly, vol.18, no.2, April 1972, p.149–57.
Surveys developments in KWIC, KWOC, double-KWIC and other methods of indexing.

GORDON, IRVING *and others*
Utilization of terse conclusions in an industrial research environment.
Journal of Chemical Documentation, vol.12, no.2, May 1972, p.86–8.
The use of terse conclusion by Hooker Research as report surrogates, for current awareness and in information retrieval.

ORTH, MELVIN
Abstracting for the writer.
IEEE Transactions on Professional Communication, vol.PC-15, no.2, June 1972, p.43–4.

Classification and Cataloguing

DUNKIN, PAUL S.
Two decisive decades: cataloging and classification—the big IF.
American Libraries, vol.3, no.7, July/August 1972, p.775–83.
Developments 1951–71, including catalogue codes and the Dewey and Library of Congress Schemes.

BHATTACHARYYA, G.
General theory of library classification and classifying according to UDC.
Library Science with a slant to Documentation, vol.9, no.2, June 1972, p.197–228.

PARAMESWARAN, M. *and* GOPINATH, M. A.
Sequence of subject in CC and UDC: a case study.
Library Science with a slant to Documentation, vol.9, no.2, June 1972, p.258–65.

SWEENEY, RUSSELL
Dewey 18.
Catalogue & Index, no.26, Summer 1972, p.1, 10–12.
A review of the new 18th edition of the Dewey classification.

NEELAMEGHAN, A.
Economics of human resource: depth classification version of CC.
Library Science with a slant to Documentation, vol.9, no.2, June 1972, p.229–57.

GORE, DANIEL
In hot pursuit of FASTCAT.
Library Journal, vol.97, no.15, 18 September 1972, p.2693–5.
A system designed to avoid the cataloguing delays of the Library of Congress and make acquisitions immediately available to users.

HUMPHREYS, K. W.
Shared cataloguing.
LIBER Bulletin, no.1, 1972, p.26–32.
The potential effect on shared cataloguing of the U.S. National Program for Acquisitions and Cataloguing (NPAC), MARC II and Project MONOCLE.

Mechanization

LUCAS, HENRY C.
Influencing computer decisions.
Special Libraries, vol.63, no.7, July 1972, p.281–4.
How an organization's Information Services Dept. decides which new applications of computer-based systems should be made, with particular reference to the automation of special libraries.

GRIFFIN, HILLIS
Computer applications for small libraries.
Law Library Journal, vol.64, no.2, May 1971, p.161–6.
A general survey.

TYSKEVIC, N. I.
Mechanization and automation of information and library operations in the USSR and their development prospects.
Unesco Bulletin for Libraries, vol.26, no.5, September–October 1972, p.247–52.

SMITH, FREDERICK E.
Computer application to legal documentation: what is not being done.
Law Library Journal, vol.64, no.2, May 1971, p.114–18.
Discusses lack of national co-ordination, government support, etc.

NYCUM, PETER
Looking ahead: law and the new technology.
Law Library Journal, vol.64, no.2, May 1971, p.119–25.
Suggests a method of approach to automation for law librarians and an educational programme for this purpose.

HOFFMAN, WARREN S.
Du Pont Information Flow System.
Journal of Chemical Documentation, vol.12, no.2, May 1972, p.116–24.
An automated system for storing and retrieving information on company reports in E. I. du Pont Nemours and Co.

YAMMOTO, TAKEO *and others*
Todai Scientific Information Retrieval (TSIR-1) System: II: generation of a scientific literature data base in a center-oriented format by a tape-to-tape conversion of CAS SDF data base.
Journal of Chemical Documentation, vol.12, no.2, May 1972, p.113–16.
The work being done at Tokyo University, Department of Chemistry.

DAUMAS, ALBAN
La bibliothèque de l'Université de Nice et ses perspectives d'automatization.
Bulletin des Bibliothèques de France, vol.17, no.6, June 1972, p.273–86.
Automation of Nice University Library.

ALONSO, PATRICIA G.
Feasibility study on computer-produced map catalogue.
Australian Library Journal, vol.21, no.6, July 1972. p.245–52.
A study undertaken at the State Library of Victoria in Australia.

ROGOVE, LINDA
Attribution studies: a review.
Drexel Library Quarterly, vol.8, no.2, April 1972, p.183–92.
Computerized techniques for discovering the author of unattributed works.

Subject Organization

WOODS, BILL M.
Two decisive decades: the special library concept of service.
American Libraries, vol.3, no.7, July/August 1972, p.759–68.
Development of special libraries in the U.S. 1951–71.

PHINNEY, ELEANOR
Two decisive decades recognizing the institutional libraries.
American Libraries, vol.3, no.7, July/August 1972, p.735–42.
Libraries of hospitals and similar institutions in the U.S. 1951–7.

LOGAN, R. G.
Law libraries in Britain: Part I.
Assistant Librarian, vol.65, no.8, August 1972, p.118–22.

LOGAN, R. G.
Law libraries in Britain: part II.
Assistant Librarian, vol.65, no.9, September 1972, p.140–1, 152.
The coverage of legal material in Britain's national government and public libraries, the contents of the libraries, the classifications used and the librarians employed.

CULP, ROBERT W.
The Mount Sinai Hospital Library, 1883 to 1970.
Bulletin of the Medical Library Association vol.60, no.3, July 1972, p.471–80.
The role of the Library, in New York City, has recently been expanded in the Mount School of Medicine.

JENKINS, OADIS G.
Liquid Metals Information Center.
Information: part 1: news, sources, profiles, vol.4, no.4, July–August 1972, p.234–7.
A centre for evaluated information on the technology of sodium and NaK alloys as heat-transfer fluids.

HENDERSON, KAY (ed.)
Pollution: sources of information: proceedings of a one-day conference (of the Library Association Reference, Special and Information Section and the Aslib Transport and Planning Group) held at the Library Association, London 27th October 1971.
London: Library Association Reference Special and Information Section, 1972.
85365–4.
iii, 102p.

FERRUSO, AGNES
Library of Congress Monthly Checklist/State Documents Section.
Illinois Libraries, vol.54, no.6, June 1972, p.403–5.
The purpose and compilation of a monthly record of official publications from individual states in the Union.

MOORE, JULIE L.
Bibliographic control of American doctoral dissertations: 2. an analysis.

Special Libraries, vol.63, no.7, July 1972, p.285–91.
A comparison between *American Doctoral Dissertations* and *Dissertation Abstracts*.

Reprography

RUBLEV, YU. V. *and* BURYAK, N. K.
Osnovnye voprosy razrabotki mikrofil'movikh selektorov automatizirovannikh IPS.
Nauchno-tekhnicheskaya Informatsiva, Seriya 1, no.5, 1972, p.21–5.
The use of microfilm in automatic information retrieval.

TRESSEL, GEORGE W.
A personal microform system.
Journal of Micrographics, vol.5, no.6, July 1972, p.287–9.
A system utilizing a cable TV terminal and microform at the user's desk.

AVEDON, DON M.
Standards: International Organization for Standardization.
Journal of Micrographics, vol.5, no.6, July 1972, p.311–13.
The Working Groups of the ISO responsible for microfiche and microreproduction.

BERNSTEIN, GEORGE B.
Why 24x/48x?
Journal of Micrographics, vol.5, no.6, July 1972, p.295–300.
Standardization of microfiche format.

HARRISON, TOM L.
Evaluating microplan applications.
Journal of Micrographics, vol.5, no.6, July 1972, p.301–9.

LA SCALA, JANE
Copying machines for libraries: a look at the current crop.
Australian Library Journal, vol.21, no.5, June 1972, p.192–201.
Nine electrostatic copiers are evaluated plus the 3M251 dual spectrum copier and Thermofax 45.

Printing and Publishing

UNESCO
Symposium of editors of documentation, library and archives journals, Paris, Unesco House, 16–18 May 1972: summary report.
Paris: Unesco, August 1972.
25p. (COM-72/CONF, 11/6)

LANE, ALFRED H.
Reprints in the preservation picture: and a drift aside.
Special Libraries, vol.63, no.7, July 1972 p.305–9.
Library problems with reprints: pricing, library responsibility for choosing and promoting reprints and the need for more communication between librarians and reprinters.

MELCHER, DAVID
Two decisive decades: discovering the library market place.
American Libraries, vol.3, no.7, July/August 1972, p.811–14.
Publishers sales to libraries in the U.S. 1951–71.

WOOD, W. A.
The high cost of publishing.
Australian Library Journal, vol.21, no.7, August 1972, p.273–6.
The problems of Australian publishing, and possible solutions.

MILLER, ELIZABETH *and* TRUESDELL, EUGENIA
Citation indexing: history and applications.
Drexel Library Quaterly, vol.8, no.2, April 1972, p.159–72.

NIENTIMP, JUDITH A. *and* GREENFIELD, STANLEY R.
The librarian and the subscription agent.
Special Libraries, vol.63, no.7, July 1972, p.292–304.
A librarian's complaints against subscription agents, and an agent's description of his operations, especially his problems.

CLAPP, VERNER W.
The suit of Williams and Wilkins Co. *v.* the United States: recent developments.
ACLS Newsletter, vol.23, no.2, Spring 1972, p.1–5.

THOMPSON, N. G.
The case for HMSO.
The Author, vol.83, no.6, Autumn 1972, p.113–15, 117.
H.M.S.O. and Crown Copyright and the position of the author.

Administration and Management

CAMPBELL, D. J.
Small technical libraries: part 1: a guide for librarians without technological training.
Unesco Bulletin for Libraries, vol.26, no.5, September–October 1972, p.259–78.

FROME, JULIUS
Amortization of indexing (input) costs.
Journal of Chemical Documentation, vol.12, no.2, May 1972, p.98–101.
Calculating the number of searches of an automated system needed to amortize indexing costs.

BOOKSTEIN, ABRAHAM
Congestion at card and book catalogues: a queuing theory approach.
Library Quarterly, vol.42, no.3, July 1972, p.316–28.

MACKENZIE, A. G. *and others*
Computer-aided instruction in scientific and technical information systems management: final report for period June 1971–June 1972: report to OSTI on Project SI/

14/67, by A. G. Mackenzie, P. Brophy, M. K. Buckland, G. Ford and A. Hindle. Lancaster: Lancaster University Library August 1972. iv, 90p. (OSTI Report no.5130)

EVANS, G. EDWARD *and others*
Library environmental design: physical facilities and equipment: final report: phase I: October 1 1970–December 31 1970, by G. Edward Evans, Le Moyne Anderson, Ralph Iredale, Peter Kamnitzer and Thomas Vreeland. Los Angeles (Calif.): California University Institute of Library Research, February 1972. 261p. (TISA Project Report no. 33 AD 736 871)

ACADEMIC ARCHITECTURE
Architect's Journal, vol.156, no.34, 23rd August 1972, p.419–23. New university libraries at Cambridge, Cardiff and St Andrew's.

TALBOT, J. C.
Acquisitions for greater efficiency. *Library Association Record*, vol.74, no.9, September 1972, p.165–6. Describes a number of important new bibliographical aids and attempts to assess them in the context of acquisitions work.

ROBBINS, DONALD C.
Current resources for the bibliographic control of sound recordings. *Library Trends*, vol.21, no.1, July 1972, p.136–46. Includes catalogues, trade lists and periodicals.

ENRIGHT, B. J.
New media materials and the library. *LIBER Bulletin*, no.1, 1972, p.49–81. The options open to librarians *vis-à-vis* audio-visual media, and how these media may best be organized in libraries.

TOPPER, LOUIS
Some problems and pointers for those introducing AV materials into the library. *Wilson Library Bulletin*, vol.47, no.1, September 1972, p.42–5. Problems of collection building (insufficient) evaluation time, varied formats, etc.) and usage (deficient equipment, lack of training, etc.) with recommended solutions.

COLBY, EDWARD E.
Sound scholarship: scope, purpose, function and potential of phonorecord archives. *Library Trends*, vol.21, no.1, July 1972, p.7–28. Gramaphone record archives in the U.S.A.

WELCH, WALTER L.
Preservation and restoration of authenticity in sound recordings. *Library Trends*, vol.21, no.1, July 1972, p.83–100.

MEYER, SANDRA M.
State documents in an Anglo-American law collection. *Illinois Libraries*, vol.54, no.6, June 1972, p.417–20. The types of state documents which may be expected in a law library, and their handling and use.

HALCLI, ALBERT
How to escape from the documents ghetto. *Illinois Libraries*, vol.54, no.6, June 1972, p.412–15. A summary of a workshop on library handling of state documents in Illinois.

Library Systems

MUMFORD, L. QUINCY
Two decisive decades: the Library of Congress twice as fast. *American Libraries*, vol.3, no.7, July/August 1972, p.769–73. Development of the Library of Congress 1951–71.

SCHAUDER, DONALD E.
The Israeli library scene, April 1971. *International Library Review*, vol.4, no.4, October 1972, p.395–408. Covers the Jewish National and University Library, public library development, selected special libraries, library services for the blind, cataloguing and classification practice and library training.

RANGANATHAN, S. R.
National social science documentation centre: reflections and suggestions. *Library Science with a Slant to Documentation*, vol.9, no.2, June 1972, p.145–87. The problems involved in setting up a centre for India.

AUBRAC, RAYMOND
Introduction. *Quarterly Bulletin of the IAALD*, vol.17, no.2, 1972, p.52–4. Describe AGRIS, AGLINET, CARIS and other means of international co-operation among agricultural information services and libraries.

DUBOIS, G.
A computerized agricultural research information system (CARIS). *Quarterly Bulletin of the IAALD*, vol.17, no.2, 1972, p.65–7. CARIS: a project to establish an international agricultural information system for the developing countries.

HARADA, K.
The world-wide network of agricultural libraries. *Quarterly Bulletin of the IAALD*, vol. 17, no.2, 1972, p.68–77. National and regional agricultural library and information network including AGLINET.

ARIES, PHILIPPE
International cooperation: AGRIS–AGLINET.
Quarterly Bulletin of the IAALD, vol.17, no.2, 1972, p.49–51.
An international agricultural information network and international co-operation between agricultural libraries.

DUBOIS, G.
Un système international d'information pour les sciences et la technologie agricoles (AGRIS).
Quarterly Bulletin of the IAALD, vol.17, no.2, 1972, p.55–64.
AGRIS: an international information network for agricultural science and technology.

LOW, EDMON
Two decisive decades: federal consciousness and libraries.
American Libraries, vol.3, no.7, July/August 1972, p.717–24.
Government policy, legislation and support for libraries in the U.S. 1951–71.

FELSINGER, E.
The role of Commonwealth departmental libraries.
Australian Library Journal, vol.21, no.5, June 1972, p.202–8.
The changes in the functions of government departmental libraries in the Commonwealth.

FRETWELL, R. A.
Modernizing the DOE Library Service.
O & M Bulletin, vol.27, no.3, August 1972, p.142–49.
Improvement and reorganization of the Department of Environment's library system.

DIX, WILLIAMS
Two decisive decades: cause and effect on university libraries.
American Libraries, vol.3, no.7, July/August 1972, p.725–31.
Government policy, support and legislation for university libraries in the U.S. 1951–71.

COLE, WILLIAM P.
Research library co-operation.
Illinois Libraries, vol.54, no.6, June 1972, p.453–60.
How co-operation can help alleviate the problems of research libraries, co-operative projects involving the Pius XII Library, St Louis and future possibilities.

LANGHANS, SIEGFRIED
Rationalisieren durch Kooperation.
Zentralblatt für Bibliothekswesen, vol. 86, no.8, August 1972, p.474–9.
Co-operation between East German libraries.

Professional Activity

SHERA, JESSE H.
Two decisive decades: documentation into information science.
American Libraries, vol.3, no.7, July/August 1972, p.785–90.
Surveys developments 1951–71.

MENDELOVICI, M.
Documentary informatics: a new science.
Probleme de informare si Documentare, no.8, August 1972, p.5–25.
Surveys the history, coverage and controversies of information science.

SNYDER, PATT
Career planning.
Special Libraries, vol.65, no.7, July 1972, p.310–12.
How librarians may facilitate promotion by career planning, i.e. establishing a goal, selecting short-term objectives, and planning action. Continuing education and assessment are also necessary.

GREENAWAY, EMERSON
Two decisive decades: progress in international librarianship.
American Libraries, vol.3, no.7, July/August 1972, p.803–6.
The work of UNESCO, the American Library Association's International Relations Board and the International Relations office 1951–71.

MORTON, ELIZABETH
Two decisive decades: American confrères: CLA and ALA.
American Libraries, vol.3, no.7, July/August 1972, p.815–24.
The American Library Association and the Canadian Library Association 1951–71.

STEVENSON, GRACE T.
Two decisive decades: ALA—the fight for library service.
American Libraries, vol.3, no.7, July/August 1972, p.711–16.
The work of the American Library Association, 1951–71.

WHITE, ALAN
Crossroads.
Assistant Librarian, vol.65, no.9, September 1972, p.134–9.
The Association of Assistant Librarians in the light of the recent report by the Library Association's Working Party on Association Services.

SUMMERS, WILLIAM
Two decisive decades: the emergence of library education.
American Libraries, vol.3, no.7, July/August 1972, p.791–4.
Library education in the U.S. 1951–71.

BRIMELOW, T.
Newly trained information scientists: the future.
Information Scientist, vol.6, no.3, September 1972, p.101–6.
The influences on the design of higher education courses in information science, and likely future trends.

LOUCKY, C.
Stepping up efficiency of documentary information training.
Probleme de Informare si Documentare, no.7, 1972, p.5–27.
A review and evaluation of training programmes for information workers in Romania.

CENTRE BELGE DE TRADUCTIONS
Besoins de la recherche scientifique universitaire et industrielle relatifs l'information et a la documentation en langues difficilement accessibles.
Brussels: Bibliotheque Royale, 1972.
vi, 26p.

MEMBERS' ADVERTISEMENTS

Acceptance of advertisements for publication in Proceedings *does not imply Aslib support for or endorsement of the goods or services advertised.*

Members' advertisement rates: first 15 words (minimum), 50p; 3p for each additional word. 10p if box number required. (No agency discount.) A separate section of these columns is available to non-members at £3 per s.c.i.

Translation services

MEDICAL AND HIGHLY SPECIALIZED SCIENTIFIC TRANSLATIONS. S.M.Bonnekamp, FIL, Member of the Translators' Guild (Med. Science & Lit.), 47 Firs Close, Muswell Hill, London, N10. Tel. 01-883 3962 during office hours. After office hours an automatic telephone answering machine will record messages.

BUILDING AND CIVIL ENGINEERING TRANSLATIONS from Russian and German into English. G. L. Cairns, MIL, 19 Kingsley Place, London N6. Tel. 01-340 8990.

TECHNICAL SWEDISH, DANISH, NORWEGIAN translated by J. T. Craddock, BCOM, FIL, Ekard, Ray Park Avenue, Maidenhead, Berks. Maidenhead 24931.

JAPANESE/ENGLISH RUSSIAN/ENGLISH translations. Chemistry, medicine, biology, zoology. D. A. Fraser, BA, MIL, 22 Gresley Road, London, N19 3JZ. Tel: 01-272 5664.

WILFRED E. GOODAY, ARSM, DIC, C.ENG, MIMM, FIL. Member of Translators' Guild, Romanian and French. 161 Rivermead Court, London SW6, RENown 1912.

SCIENTIFIC TRANSLATIONS FROM JAPANESE, CHINESE, RUSSIAN, CZECH and East and West European languages into English and/or German. A. K. Henn, B.SC, 'Glenside', Lower Leigh Rd., Pontnewynydd, Pontypool, Mon. Tel: Pontypool 3689 (after 6 p.m.).

BILINGUAL (JAPANESE/ENGLISH), ESTABLISHED translator of an extensive range of subjects in science and technology. Owns a bilingual reference library and typewriters for symbols and Greek, Western European and Japanese languages. David Jackson, FIL, FCS, 71 Livingstone Road, Gillingham, Kent. Telephone: 0634 52994.

MEDICAL, PHARMACEUTICAL, BIOLOGICAL translations from French, Romanian and Portuguese into English and from English into French and Romanian. Dr J. Jacobson, 94 Temple Fortune Lane, NW11. 01-455 1010.

TECHNICAL TRANSLATIONS from Russian, German and Polish into English. B. Klipstein, BSC(HONS), 1 Glenview Grove, Shipley, Yorkshire. Tel. Shipley 58215.

TECHNICAL AND COMMERCIAL translations from English into Russian. Mrs O. Linsley, 31 Parke Road, Barnes, London SW13. Tel. 01-748 8822.

TECHNICAL TRANSLATIONS from Japanese into English. R. A. Scutt, BA, 48 Somerset Avenue, West Wimbledon, London SW20. Tel. WIMbledon 1713 (01-946 1713).

TECHNICAL OR COMMERCIAL translations into/from English, German, Dutch and French. A. M. H. Speller, FIL, NGV, 6 Lakeside, West Ealing, London W13 8HN. Tel. 01-998 1045.

AUTHORITATIVE TECHNICAL TRANSLATIONS. Spanish, French, Italian, German, Portuguese, camera copy or printed. E. W. Sykes, FIL, 39 West Close, Wembley, Middlesex, HA9 9PJ. Tel. 01-904 4273.

Advisory services

IRAS: A NEW ADVISORY SERVICE. As much or as little advice and assistance as you need—anything from a half-day's talk to a six-months' assignment. Miss Helen Townley, I.R. Advisory Services, 117 Wickham Chase, West Wickham, Kent, BR4 0BQ. 01-777 7560.

Course

Leeds Polytechnic. INTRODUCTION TO THE WISWESSER LINE-FORMULA NOTATION. A two-day course organized by the Department of Librarianship, Leeds Polytechnic, in association with the Chemical Notation Association, 30th to 31st January, 1973. Cost £8. Details from D.H. Revill, Director of Short Courses, Dept. of Librarianship, Leeds Polytechnic, 28 Park Place, Leeds LS1 2SY. (Tel. 26696).

NON-MEMBER'S ADVERTISEMENTS

YOUR COMPANY HISTORY—whether book or booklet, commission a full-time professional industrial historian to research and write it. Hugh Barty-King, BA(CANTAB), Holgate House, Ticehurst, Wadhurst, Sussex; Tel. Ticehurst (05807) 557.

For Sale

LIBRARY SHELVING. Grey steel island library shelving bays 7 ft 6 in. high; 3 ft. wide; 9 in. deep. Shelves detachable and adjustable. Double sided. 250 bays available in AS NEW condition at special price of £7 per bay of 7 shelves. Normal price in excess of £20. Photographs and all particulars available from: W. F. Holmes, Ltd., 76a Westbourne Grove, London, W2 5SH. Tel. 01-727 1268/9.

Commonwealth of Australia

Librarian Class 3

$A8234-9267

Central Office, Canberra

The position is that of a Systems Librarian, who, under the general direction of the Principal Librarian, is responsible for the Departmental Information Retrieval Systems serving some 1600 scientists, engineers and other professional officers employed by the Department.

Duties: Design, review and modify departmental library practices, prepare job specifications for ADP applications to library procedures and liaise with significant user groups for preparing subject interest profiles.

Qualifications: University degree and Registration Certificate of Library Association of Australia or its equivalent.

Travel and General Conditions: First class air or sea passage will be paid for the successful applicant and his family to Australia together with generous baggage allowance; salary will be paid from date of embarkation. Three weeks annual leave, cumulative sick leave and an attractive Superannuation scheme also apply.

Applications: Applications and/or enquiries should be forwarded to:

The Senior Representative,
Department of Supply,
Australia House,
Strand,
London WC2B 4LA

INTERNATIONAL NICKEL LIMITED

require two Information Officers to join the Technical Information Services of their European Research and Development Centre in Birmingham.

Successful applicants will be required to abstract and index metallurgical literature for input to a computerised data bank, and to answer enquiries from within the Company. They should be aged under 35, and should have a degree (or equivalent) in Metallurgy, Chemistry or Materials Science. Knowledge of a European language other than English would be an advantage.

Applications, in writing, giving details of qualifications and experience, should be made to:

The Manager,
International Nickel Limited,
European Research and Development Centre,
Wiggin Street,
Birmingham, B16 0AJ.

LIBRARY BINDING

This has been our trade since the last century, and in practising our craft we have given service to all types of libraries in many corners of the World.

We like to think we still bind books for libraries rather well, apart from our other activities as publishers and booksellers.

CEDRIC CHIVERS LTD

PORTWAY
BATH BA1 3NF

Emission, Absorption and Transfer of Radiation in Heated Atmospheres

B. H. Armstrong and R. W. Nicholls

Presents a review of the basic theory of radiative transfer pertinent to opacity calculations, along with the requisite quantum theory of radiation as applied to real atomic and molecular systems.
320 pages £7.00 hard cover

Progress in Aerospace Science, Volume 13

Editor D. Küchemann

Contains specially commissioned review articles, which provide the specialist reader with an orderly and concise survey of recent work and give the general reader the opportunity to become usefully informed of recent developments in the field.
300 pages £10.00 hard cover

Matrix Structural Analysis

J. J. Azar

Presents the theory and practical application of matrix structural analysis, which, with the advent of high speed computers, is gaining prominence throughout industry.
232 pages £4.80 hard cover

Automated Structural Analysis:
An Introduction

W. R. Spillers

A computer-orientated text which presents an introduction to structural analysis for undergraduate students and engineers who solve structures by computer.
182 pages £3.25 hard cover

How to Find Out About Statistics

Gillian A. Burrington

Covers careers and training for statisticians, and the information sources available to them.
160 pages £2.75 hard cover

PERGAMON

Headington Hill Hall,
Oxford OX3 0BW

The City University

St. John Street
London EC1V 4PB

Applications are invited for the post of

UNIVERSITY LIBRARIAN

The salary will be within the range for professorial appointments. Superannuation in accordance with provisions of the F.S.S.U.

Further particulars and application forms may be obtained from the Academic Registrar at the above address.

Please quote reference L/A.

FIRST for carpets
Dodson Bull

UP TO 30% DISCOUNT
BRANDED CARPETS

● All makes available with full Manufacturers' Guarantees ● NO IMPERFECT GOODS SOLD ● Free delivery in U.K. ● Expert fitting service available

£200,000 carpets on display

In our extensive London and provincial showrooms

Free brochure on request to Dept. ALB

DODSON BULL CARPET CO. LTD.

LONDON: 5 & 6 Old Bailey EC4M 7JD. Tel: 01-248 7971
BIRMINGHAM: 164 Edmund St B3 2HB.
Tel: (021) 236 5862
BOURNEMOUTH: 268 Old Christchurch Rd BH1 1PH.
Tel: 21248
BRIGHTON: 2-5 North Road BN1 1YA. Tel: 66402
BRISTOL: 2-3 Royal London House, Queen Charlotte St
BS1 4EX. Tel: 28857
LEEDS: 12 Great George St LS1 3DW. Tel: 41451
MANCHESTER: 55-61 Lever St M1 1DE.
Tel: (061) 236 3687/8/9
NEWCASTLE-upon-TYNE: 90-92 Pilgrim St NE1 6SQ.
Tel: 20321/21428
WESTCLIFF-on-SEA: 495 London Rd SS0 9LS.
Tel: Southend 46569
9.00-5.30 Mon.-Fri. Sat. 9.00-12.00 (Manchester 9.00-4.00).

SCIENTIFIC BOOKS,

LIBRARIES AND COLLECTORS

3rd edition by

John L. Thorton & R. I. J. Tully

Scientific publications and their patrons from before the start of printing to the present. An outstanding 85-page bibliography is complementary to a fine piece of scholarly research.

£7 (£5·60 to L.A. members)

THE LIBRARY ASSOCIATION

British Technology Index

CURRENT SUBJECT GUIDE TO BRITISH TECHNICAL JOURNALS

FOR TRACING AND RECALL

of { specific / recent } information

In the Field of Applied Science, Engineering and Manufacturing Technology

Monthly Parts and Annual Volume

THE LIBRARY ASSOCIATION

7 Ridgmount St. Store St. London, WC1 7AE
(Phone: 01-636 7543)

12 MAR 1973

AT LAST:

A social sciences reference tool that's easy to use, highly current, and multidisciplinary too!

Beginning in 1973 it will be a lot easier to search the social sciences journal literature if your library has the new *Social Sciences Citation Index*™ (*SSCI*™).

SSCI will offer an integrated search system designed to overcome the ambiguous terminology and wide scatter of related articles that used to make social science searches so difficult. It will take advantage of two powerful retrieval methods: Citation Indexing—which utilizes the fact that an article's reference citations to earlier publications are excellent indicators of the subject of the article, and Permuterm® Indexing—a natural language system that pairs every significant word in an article's title with every other word in that title to produce extremely specific, two-level indexing entries.

With *SSCI*, all you'll need to start a search on any subject is the name of a key author in the field of interest or any English word that is descriptive of the subject. There's no need to master specialized search vocabularies or complex classification schemes.

With *SSCI* you won't have to use a half-dozen discipline-oriented indexes to assure comprehensive searches. A single look-up lets you search the entire output of over 1,000 journals from all the fields relevant to the social sciences including anthropology, community health, demography, economics, educational research, ethnic group studies, geography, history, law, linguistics, management, marketing, political science, psychiatry, psychology, sociology, statistics, and urban planning and development.

And because *SSCI* will be computer-produced, it will be the most current index of its size. That means you'll find new articles while they're still new.

Send the coupon for more information.

13-335

Please send me more information on your new

SOCIAL SCIENCES CITATION INDEX™.

NAME________________________
POSITION________________________
LIBRARY________________________
ADDRESS________________________
CITY__________STATE________ZIP________

isi® Institute for Scientific Information
325 Chestnut Street, Philadelphia, Pa 19106, USA
Tel (215) 923-3300 Cable: SCINFO, Telex 84-5305

©1972 ISI

Published in England by Aslib, 3 Belgrave Square, London SW1X 8PL
Printed by Alden & Mowbray Ltd at the Alden Press, Oxford